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THE OPHTHALMIC RECORD

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The October number of the OPHTHALMIC RECORD will contain, amongst others, an original article by J. Oscroft Tansley, M.D., Cyst of the Vitreous; one by W. K. Rogers, M.D., Report of Seven Cases of Retinal Sequellæ of Diseases Affecting United States Troops in Cuba and Porto Rico; one by Swan M. Burnett, M.D., A Case of Obstructed Retinal Circulation, with a series of pictures showing the changes in the vascular system during its reëstablishment, and the foundation of new vessels in the retina. There will also appear Editorials, Reviews, Society Reports, and Personals and Items of Interest to the Profession.

The RECORD particularly desires short practical papers on any subject connected with Ophthalmology. These will be published at as early a date as possible. It is understood that, unless otherwise arranged, original articles when accepted are contributed to the RECORD exclusively. Illustrative cuts will be made at the expense of the journal, and proofs for correction will be sent to authors when desired. Reprints with covers are furnished at cost. One hundred of these will be presented to authors *gratis* when a request for them is written on the original manuscript. The RECORD will be issued monthly, and each number will contain about 54 pages of reading matter.

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TABLE OF CONTENTS.

ORIGINAL ARTICLES.

1. Albuminuria and Its Relation to Diseases of the Eye, *by* **Alex. W. Stirling, M. D., C. M., Edin., D. P. H., London,** etc., *Atlanta, Ga.* 433

2. Penetration of an Eye with a Rusty Twenty-penny Cut Spike, *by* **Wm. C. Bane, M. D.,** *Denver, Colo.* (Illustrated) 440

3. Blindness from Drinking Methyl-Alcohol, *by* **H. Gifford, M. D.,** *Omaha, Neb.* 441

4. A Convenient Apparatus for Testing the Color Sense, *by* **S. Mitchell, M. D.,** *Hornellsville, N. Y.* (Illustrated) 445

5. Capsular Cataracts, *by* **H. Beckles Chandler, M. D.** (Illustrated) 447

6. Strabismus or Squint: A Theory and Treatment, *by* **Francis Valk, M.D.** .. 449

7. Correction of Divergent Strabismus by a New Method and New Instrument, *by* **D. Milton Greene, M. D.,** *Grand Rapids, Mich.* (Illustrated) .. 461

EDITORIALS.

1. Antipathy to Binocular Single Vision 466

2. Microscopes for the Examination of the Anterior Segment of the Eye ... 467

CORRESPONDENCE.

1. The Refracting Optician 470

2. Cataphoresis of the Lachrymal Duct 471

REVIEWS.

1. Orbital Complications of Empyema of the Ethmoidal Cells, *by* **Dr. Viensse,** *of Toulouse* 472

NEWS ITEMS.

Personals and Items of Interest to the Profession 481

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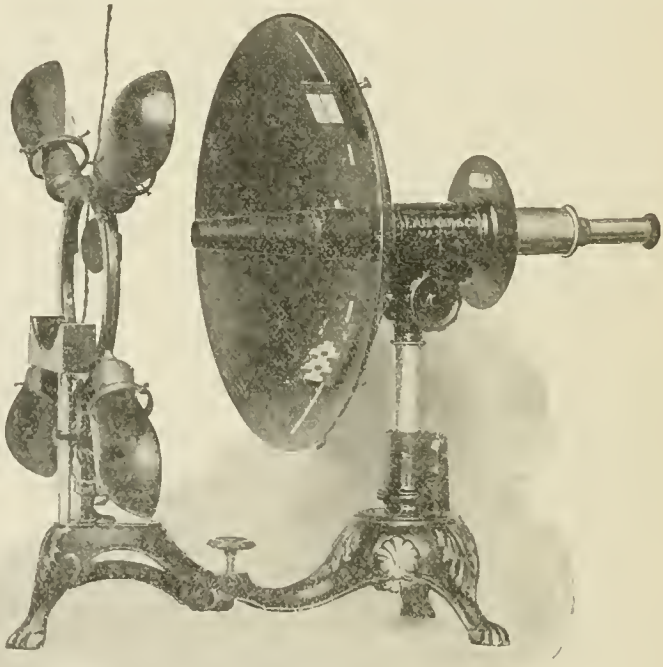

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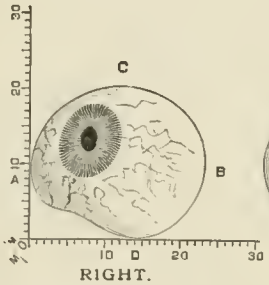

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THE

OPHTHALMIC RECORD

A MONTHLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY.

VOLUME VIII. CHICAGO, SEPTEMBER, 1899. No. 9. NEW SERIES.

ORIGINAL ARTICLES.

ALBUMINURIA AND ITS RELATION TO DISEASES OF THE EYE.*

BY ALEX. W. STIRLING, M.D., C.M., EDIN., D. P. H., LOND., ETC.

ATLANTA, GA.

The various forms of albuminuria do not bear an equally close relationship to diseases of the eye, but in that connection they all have some interest. Eye diseases, on the other hand, sometimes throw much light on albuminuria and enable us to elucidate the true import of symptoms which might otherwise pass as trifling. Albuminuria, it should be remembered, is of quite common occurrence in the general population. Before its precise frequency among young people was known, when a reaction was setting in some ten to fifteen years ago against the hitherto generally-accepted idea that renal albuminuria always meant serious derangement of the kidney, some were inclined to go to the other extreme and look upon it as lacking in pathological significance in the majority of cases. At this period such names as the "Physiological Albuminuria," the "Albuminuria of Adolescence," "Cyclic Albuminuria," and so on, were applied to the condition, but these carried no explanation with them. With the view of discovering the real frequency of albuminuria in apparently healthy people, I instituted, in 1887, a series of experiments upon the urine of 461 persons. The greatest care was taken to avoid error, and no urine was passed over till I was completely satisfied whether

*Read before *Georgia State Medical Association*, at Macon.

a precipitate were albumen or not. I have no intention of going fully into this matter, an epitome of which can be found in the London *Lancet* (December 10, 1887), along with complete figures in tabular form. But I wish to say a few words which are apropos of my present subject. In one class of 369 boys, in age varying from 12 to 16 inclusive, there were 77 albuminurics, or 20.8 per cent. I desired to find the cause of this. I eliminated George Johnson's cold-bath theory. I proved that it was not produced by food. I found that the urine passed before rising in the morning contained no albumen, but that soon after rising albumen was present, disappearing gradually toward evening. It could be made to disappear at any time by merely causing the patient to lie down, and it would never occur at all throughout the day if he remained recumbent. It will be observed that these experiments were carried on upon the supposition that posture might have something to do with the presence of the albumen. And this was conclusively proved to be the case. Indeed, posture had everything to do with it, for which reason I proposed the name "Postural Albuminuria." This name I find is now in common use by writers in English, German and French journals. There can be little doubt that, as I at first suggested, the albuminuria results from a temporary paresis of the renal vessels, but I by no means wish to be understood as meaning that this albuminuria is truly physiological. I have always held that, as there are of course degrees and kinds of renal lesions, this is merely that stage or form which is of least serious moment, though its ultimate development has not yet been laid bare. A considerable number of these urines were examined microscopically for tube casts, but except once or twice, when hyaline casts were doubtfully present, none were found. In the annual "Lettsomian" lecture last month, in which he makes frequent use of my figures, Dr. Samuel West, the lecturer for the year, remarks that in these cases the albumen is generally serum albumen, and not nuclio-albumen, which latter it is thought by some might come from the urinary passages and not from the kidney, though of this there is no proof whatever. When making my experiments I noticed that a much larger number of the boys who played wind instruments were albuminurics than of those who did not, everything else being the same. The figures were, respectively, 59.4 per cent. and 12.8 per cent.; this I put down to backward pressure. Sir T. Granger Stewart, of Edinburgh University, has since confirmed this observation, though his percentage among band players was not so high as mine. I had a letter some time ago from Dr. Theodore Maxwell, of Woolwich, who is a Russian scholar, informing me that Dr. Weinbaum, of St. Petersburg, had recently examined school boys

and had found an even larger percentage than I did, "and among bandsmen in the army his percentage is very high." Dr. Maxwell made an abstract of Dr. Weinbaum's paper for the *Lancet*, but I have never seen it. My observations, to which reference has so far been made, were in connection with adolescents, but at the same time I also as carefully examined 92 other persons at various ages up to 94 and of both sexes. This did not show that adolescence is the period of life most prone to albuminuria; on the contrary it showed that it is more common in middle and still more in advanced age than it is in youth. Dr. West has illustrated by means of a chart my figures in this lecture alongside his own more recent ones (336 persons examined for him by Dr. Levison), and Mahomed's, showing the proportion of granular to healthy kidneys. Dr. West's and my own agree in gradually ascending till at the ages of 70 or 80 some 70 or 80 per cent of those examined had albuminuria.

It is important to observe that Mahomed's curve remarkably resembles ours. As I have already said, it would be unwise to look upon "physiological" albuminuria as truly physiological. It has not been proven that even in a minority of cases the patients ever get rid of it, and as albuminurics increase with age it is improbable that they do. It indicates a weakness of some kind, and, as West shows from an array of figures from insurance offices, at ages from 20 to 40, as well as over 40, "even a trace of albumen in the urine is of considerable significance. It is more and more likely to mean disease as age advances." We must bear in mind that in granular kidney albuminuria may be scarcely noticeable, and even absent for a time. And this is the form of albuminuria which of all others affects the organs of vision. This suggests how advisable it is in certain eye diseases to make repeated examinations of the urine in the absence of albuminuria and, seeing that the condition of the eye not infrequently first indicates the condition of the kidney, how advisable it also is to have the eyes examined in those cases which suggest albuminuria, but in which it is apparently absent. The most likely time in the twenty-four hours in which to find a urine albuminous is, I may say, in my belief, some three hours after the patient has risen from bed. From what has been said it is evident that in cases of apparently physiological albuminuria it is well to consider even in young people the possibility of the presence of contracting granular kidney. The importance of considering these cases of so-called physiological albuminuria is emphasized by the fact that Eales, who examined the eyes of 14 such cases, young men between 11 and 28, found typical retinal changes in five of them, a sufficiently startling statement. An important question is, "What

forms of albuminuria may be accompanied or followed by albuminuric retinitis?" Cases have been reported as dependent upon even amyloid degeneration of the kidney, though these are certainly an exceedingly rare accompaniment of a rare disease, and probably occur only when amyloid degeneration complicates a previously existing granular condition. It is found with the albuminuria of pregnancy, and it is said to be occasionally seen along with the acute parenchymatous nephritis of infectious diseases, such as scarlet fever, as well as the more chronic "large white kidney," but as albuminuric retinitis is certainly peculiarly related to granular renal diseases we must remember that granular kidney may have existed before the acute attack.

The ocular condition may go long undetected, for subjective *symptoms* may, and generally do, remain absent until the case is very far advanced indeed. So long as the macula escapes and the disordered areas are individually of small extent the eye may be yet very seriously diseased before the vision is notably affected. The state of the eye is not infrequently quite unexpectedly discovered, which is often the patient's as well as the physician's first indication of any serious trouble. When vision does become affected it often rapidly goes down hill, though it seldom entirely disappears. The affection is generally binocular, though a number of monocular cases have been reported. I have myself seen only one such. This is mainly a disease of late middle life, but cases are found in youth, even in childhood. These latter seem rather to indicate a dependence upon congenital syphilis. It is not really known in what proportion of cases of granular kidney albuminuria develops, though various statements have been made. The ophthalmoscopic picture of typical retinitis albuminurica ought to be of interest to all practitioners of medicine, because it reveals to the eye in the living body pathological changes which may be more marked in the retina than in other tissues, its vascular supply being terminal, without anastomoses, but is illustrative of lesions present in other and more vital organs, such as brain and kidney. These visible ocular changes have been best described by Marcus Gunn, but I shall place them under five heads. One or other of them usually predominates, though they may all be present at the same time. They are: (1) vascular changes, (2) hemorrhages, (3) white spots, (4) exudations, (5) neuritis.

(1) The pathological condition, which, if not always noticeable, yet probably underlies all the others, is the change in the vessels. This change is made up of an apparent narrowing in the size of the arteries compared to the veins, the broadening of their light streak, their tortu-

osity, the disappearance of such part of a vein crossing beneath an artery as is covered by the walls of that artery, which, though another explanation has been given, seems to show that these walls are opaque, as does their visibility when lying beneath a vein; occasional local fusiform swellings on some of the smaller arteries, and distension of veins with loss of central light streak from compression by thickened arteries crossing them.

The morbid anatomy to which these changes are due consists in a thickening and degeneration of the walls of the arteries in each of their coats, but especially the intima, frequently hyaline in appearance, but not giving the chemical reaction of amyloid degeneration, and sometimes so marked as to produce total obliteration of the lumen on the one hand, and permit of aneurismal dilatation on the other. Even the capillaries may be so much affected as to remain open on division. These appearances are not confined to the retina, but are found in all the vascular parts of the eye. In the rare cases originating with acute infectious diseases, of which I personally cannot recall an example, it may be that the renal and ocular lesions are synchronous in their beginning, but it is most probable that in cases of granular kidney the renal pathology precedes that of the eye, and that the latter results from abnormal and irritating constituents of the blood in spite of those cases in which the ocular affection has been observed before albuminuria was discovered.

(2) Hemorrhages, as might be expected from such vessels, are frequent. They are generally minute, but may be so large as to fill the vitreous chamber. Occasionally hemorrhagic glaucoma follows in their wake. It is not unlikely that in some cases thrombosis is present. The bleeding is most frequently from veins or capillaries, but may also come from arteries, and may be in any part of the fundus. It is more frequently toward the vitreous aspect of the retina in the nerve-fiber layer, whose anatomical arrangement then gives it a flame-shaped appearance, than in the deeper layers in which it is more circular. Hemorrhages may gradually become absorbed.

(3) The white spots, though actually preceded by disease of the vessels, are yet very frequently the first visible lesion. They are usually quite small, are situated toward the vitreous aspect of the retina in the region of the macula, and very often between it and the disc. They very commonly form lines like the spokes of a wheel, radiating from the yellow spot. They are somewhat chalky in appearance, but may be bright and glistening. The spots, which, when brilliant, contain cholestrin, are produced by the fatty degeneration of nerve and fibrous tissue as well as of old exudations. The radiation round the macula has been said to result

from the degeneration of the fibers of Mueller, which there, instead of being vertical, run obliquely in the retinal tissue and thus present their length rather than merely their ends to view; but according to Marcus Gunn the lines arise from folding of the retina by œdema. The region of the macula contains neither arteries or veins, and this should be remembered when considering its special liability to degeneration. These spots are seldom, in cases of granular kidney, seen to disappear.

(4) The state of the vessels, along with the increased blood pressure incident to the renal affection, constitutes a condition of things in which exudations are a certainty. Œdema affects other tissues of the eye as well as the retina and replaces the normally distinct outlines of the fundus by a delicate grayish cloudiness. Lymph may exude in places and give rise to white spots, which may be confused with the spots of degeneration already described, but they are less defined in outline, may be raised above the normal level of the retina and are woolly in appearance. It is these white spots which are liable to change in position, to diminish in intensity, and even to disappear. Serous exudations behind the retina not infrequently separate it from the choroid. These detachments tend to be peripheral and symmetrical in both eyes. In cases due to pregnancy they sometimes disappear by reattachment on absorption of the exudation. Occasionally detachments are hemorrhagic in origin. The microscope shows the retinal tissues separated by spaces filled with fluid, while the rods and cones are apt to be swollen, though they may be normal.

(5) Swelling of the optic disc with blurring of its edges is common, and sometimes this may be excessive and bear a close resemblance to the "choked disc" of cerebral tumors, which resemblance may be intensified by the presence of vomiting and headache. The usual signs of secondary atrophy are liable to appear at a later date.

The *prognosis* in albuminuric retinitis depends upon the disease accompanying it. When due to removable causes, such as pregnancy, the ocular lesions may cease with their cause. It is in chronic renal disease, especially granular kidney, that albuminuric retinitis appears as one of the most certain indications that the final stages of the patient's life have arrived. Vision, indeed, may all through continue fairly good, though it is liable gradually or suddenly to become seriously involved or even lost, but it is as an indication of his approaching end that in these cases that albuminuric retinitis has its chief importance. If the patient lives for 24 months after its discovery he survives beyond the average time, for many die within a very few months. Cases have been recorded, however, of the

prolongation of life to several, even to 12 years. This depends, of course, somewhat on the period of its discovery and upon the patient's circumstances. The wealthy classes, who can choose their environment, are known to live longer than the poor.

There is not time to consider the *diagnosis*, which, however, rarely presents difficulties. I *have* seen it hard to say whether the ocular appearances were due to renal mischief or to a cerebral tumor, and this has been the experience of others. Between albuminuric retinitis and that associated with diabetes the ophthalmoscope can really make no proper distinction. Diabetic cases are not infrequently also albuminuric, and it should be borne in mind that, though kidney changes are undoubtedly secondary and variable in kind and degree, they are always present. These consist of one or more of the following: Enlargement and fatty degeneration; contraction of the whole organ and thinning of its cortex; not uncommonly all the histological appearances of granular kidney; hyaline transformation of the epithelium of Henle's tubes; tubercle, lardaceous, disease, and even gangrene have been found.

The *treatment* is that for the disease preceding the ocular affection and, without going into particulars, may almost be summed up in the words purgation, diaphoresis, climate and hygiene.

While, in the short time properly allowed for these papers, we naturally, when dealing with the relation of albuminuria to eye diseases, consider first and chiefly albuminuric retinitis, it would be a great oversight to omit entirely those others which are equally closely related to it and are indeed dependent upon the same cause. I shall in closing say merely a few words concerning them. They may very well be divided into those which depend upon lesions of the visual apparatus: *first*, outside the brain (among which is of course albuminuric retinitis itself), and *second*, within the brain. Among the former œdema and hemorrhage in the lids and conjunctiva, hemorrhage into the optic nerve and into the orbit. Embolism or thrombosis of the central vessels of the retina is probably less uncommon than has been supposed. Iritis and cataract are probably little, if any, more common in albuminurics than in the general population.

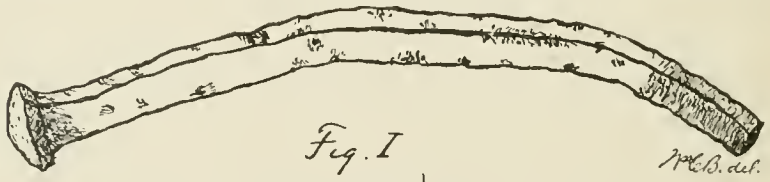
Among intra-cranial lesions hemorrhage into the nuclei or trunks of the nerves supplying them has been said to produce temporary paralysis of some of the external muscles of the eye. Uræmic amblyopia is more frequently met with. It is probably the result of extreme cerebral anæmia due to vascular contraction caused by the irritation of poisonous matters in the circulation. The resulting blindness usually affects both eyes, and may be incomplete and transient, or absolute vision returning only after

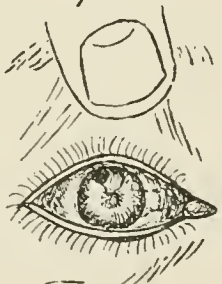
some hours' duration, though it may be delayed for three or four days. The pupils generally react to light, which indicates the cortical origin of the attack, but occasionally they do not, and then the nerve or optic ganglia are involved. In these latter cases the optic disc is likely to be found swollen. When recovery of vision does not fully take place there must be some organic lesion, and post-mortem examinations have shown that apparently functional cases have sometimes had their origin in small hemorrhages. It should also be noted that central amblyopia is not infrequently accompanied by other nerve symptoms, such as hemiplegia.

PENETRATION OF AN EYE WITH A RUSTY TWENTY-PENNY CUT SPIKE.*

BY WM. C. BANE, M.D.,
DENVER, COLO.
Illustrated.

A. F., male, age 6 years, was referred to me by Drs. Eckerson and Harvey, April 12, 1898, at 7:30 P. M. Two hours previously the child had been accidentally struck in the right eye with a rusty twenty-penny cut





spike. The eyeball was collapsed. A Y-shaped wound had been made in the cornea, the forks of which extended to the margin in the upper quadrants and the stem downward 1 mm. into the sclera. The blood-stain

*Case exhibited before the *Denver Ophthalmological Society*, April 21, 1899.

on the spike indicated that the point had entered the ball five-eighths of an inch. (See Fig. 1.) The eyeball was so completely collapsed that I was led to believe that as the nail dropped out, evidently by its own weight, that most of the contents of the globe had been lost. However the following morning the ball was quite full, with fair tension and the corneal wound gaping.

At the time of the accident and subsequently the child had very little pain in the eye. The corneal wound healed slowly, there being a little sloughing, but no active inflammation in the ball.

As the ciliary region was not involved enucleation was deferred. The ball shrank to three-fourths the normal size, and the cornea to five-eighths size. A coloboma exists in the upper outer quadrant of the iris, giving the impression that an iridectomy had been done, through which a faint red reflex is obtainable. Vision is nil. The ball is superior to an artificial eye. (See Fig. 2.)

BLINDNESS FROM DRINKING METHYL-ALCOHOL.*

BY H. GIFFORD, M.D.,

OMAHA, NEB.

That cases of this sort are rare can be judged from the fact that in the valuable monographs of Casey Wood (1) and de Schweinitz (2) the only one mentioned is that of Mengin (3). And so far as I know, no other case has been reported (4) until the present year, when the article of Kuhnt (5) appeared. Mengin's case had previously been reported by Viger (6), so that to the latter belongs the priority of establishing the deleterious influence of this substance upon the sight. Viger's patient was a convict of 31 years, who had drunk small amounts of methyl-alcohol off and on for three months without any decidedly unpleasant effects. The methyl-alcohol seems to have been obtained by precipitating the gums in varnish with water, the super-natent liquid containing the methyl-alcohol being used as a beverage. One day this man put two liters of water into a barrel containing a remnant of varnish, and the next day drank a half-liter of the liquid. An hour afterward he was taken with intense headache, vomiting, profuse sweating, dilatation of the pupils and delirium. The next day the delirium was gone, but he was completely blind, remaining so for a week, after which his sight slowly

*Read before the *Nebraska State Medical Society*, May 11, 1899.

returned, until, at the end of about six weeks, he could see to find his way about with the left eye, although with the right he could barely distinguish light. He then asked to be sent back to work, but ten days later he returned to the infirmary, saying that his sight was getting worse again, and this deterioration continued gradually until he became entirely and permanently blind. Viger apparently made no ophthalmoscopic examination, but when the patient was seen by Mengin two years later the latter found the optic discs of a dull, snowy white, the lamina cribrosa not visible and the vessels not markedly reduced in size.

Kuhnt's patient was a healthy man of 24 years. On the 23d of June he drank a mixture of methyl alcohol with ordinary rye-spirits (Kornbranntwein); the proportions were not known, and the man claimed to have taken only one good swig of the mixture. He felt no unusual effects from it until the afternoon of the next day, when he experienced nausea and giddiness and fell into a deep sleep, from which he awoke only for two short intervals, until the morning of the 27th; then on awakening he had severe pain in the head and found his sight much obscured. This obscuration increased, until on the 28th all perception of light was lost. He was seen by Kuhnt on July 1st, and a very slight pallor of the discs and reduction of the size of the arteries, with slight pain on extreme excursions of the eyeballs or on pressing the eyeballs back was noted. There was no light perception. The man was treated with pilocarpine, warm drinks and moderate doses of iodide of potassium. Perception of light began on July 3d and improved steadily until on July 25th V. was normal. The optic discs meanwhile had become milky white and the arteries plainly reduced in caliber, but this abnormality had nearly all disappeared when the patient was last seen on the 28th of July.

A comrade of this patient who had drunk a good deal more of the mixture was taken sick on the next day and died during the night without having been seen by a physician. The description of his symptoms indicated a severe gastro-enteritis.

Kuhnt has evidently overlooked the case of Viger and Mengin, for he refers to his own case as the first on record. He mentions the similarity of the symptoms displayed by these men to those obtained by Pohl with dogs, in which methyl-alcohol produces sleepiness, and in large and repeated doses fatal coma.

To the foregoing cases I can add the following: C. T., German, about 45 years old, on Dec. 5, 1898, drank about half a pint of a mixture containing about ⅔ water and ⅓ wood alcohol. The next day his head felt a little sore and confused, and he took another swallow of the same mixture.

On the 7th he felt the same as on the 6th until about 9 P. M., when he began to vomit and kept it up all night. During the night a terrific headache began, and the next morning everything looked foggy. The sight slowly got worse, and when he awoke on the morning of the 9th he could not see light. His physician informs me that his pupils were wide and did not respond to light, and that it pained him to move his eyes from side to side. I first saw him December 21st and found him to have no light perception, pupils wide and irresponsive to light, but responding slightly to the orbicularis test. The outer halves of the optic discs were decidedly atrophic and the disc margins were very slightly blurred, eyes otherwise normal. He was at once put upon pilocarpine sweats and large doses of iodide of potassium. After about ten days his sight began to return gradually, until, after ten days more, he could count fingers at several feet with each eye and could find his way about readily. The outer limits of the field at this time were normal for white, but he had an absolute central scotoma. This improvement, however, was destined to be of short duration. After remaining stationary for about a week the sight gradually decreased until, when he was last seen, on Jan. 20, 1899, it was reduced to hand movement at 1½ feet in the right eye and 4 to 5 feet in the left. Meanwhile the atrophy of the nerves involved the whole disc and the vessels had become decidedly small. Since then I have heard that he is entirely blind. This man took his methyl-alcohol on an empty stomach, while a comrade, who had had his dinner, drank of the same mixture (probably about the same amount) without any ill effects. This methyl-alcohol was sold by an enterprising young physician as ordinary alcohol. Another young man whom my patient knew patronized the same doctor, drank his alcohol on a Thursday night and died Saturday morning at 1, after having become entirely blind and then unconscious, during the preceding afternoon. Beside this a woman whom my patient knew obtained some alcohol at the same town and presumably at the same place, and, after drinking some of it, became unconscious and died the next day. The doctor is still at large, though not in that vicinity.

Through the kindness of Dr. E. L. Foster, of Hooper, Colo., I can add the following: Two brothers purchased a beer bottle full of "Columbian Spirits," or purified wood alcohol; the beer bottle probably held about a pint. This they poured into a half-gallon jug and filled it up with water. One of them drank freely of this mixture, the other only about three ounces. They then turned the jug over to their friends, and, in all, eight persons drank from it. The man who drank so much died

within twenty-four hours. The other brother had very severe headache, pain in the stomach, incessant vomiting, great mental excitement, but no trouble with his eyes. Another man became wildly excited, pulse and respiration very rapid, temperature normal; he was found totally blind, with reactionless pupils, twenty-four hours after he drank the alcohol, and died two hours later. This man and the other man who died did not vomit at any time. The other men had only taken about a swallow each and were affected with severe headache, vomiting and pain in the stomach, but recovered after several days. In reply to a letter which Dr. Foster wrote to the Manhattan Spirit Co., which manufactures the methyl-alcohol used by these miners, it is stated that this substance has caused death in a number of cases, and that they always put upon their packages "For external use only." But in spite of this being done in the case of the miners, and also the fact that they were warned distinctly not to drink the wood spirit, they could not resist the temptation to use it as a beverage. This makes it evident to me that hereafter methyl-alcohol should always be labeled "Poison."

From the symptoms in Kuhnt's case and in my own it is altogether probable that wood alcohol causes a retro-bulbar optic neuritis from which, if the dose taken be not too large, recovery may take place; but from the outcome in Viger's case and in my own, one should be careful not to give too much encouragement on account of the improvement which sometimes begins within a few weeks after the poisoning has occurred. That this improvement was permament in Kuhnt's case was probably due not to the treatment used, but to the small amount of methyl-alcohol which the man drank. Kuhnt's treatment was eminently rational, but practically the same plan pursued in my case was followed by only temporary results.

Since this paper was read I have read the paper of McCoy and Michael (7), also that of Dr. Moulton (8) in the July number of the Ophthalmic Record. McCoy's and Michael's patient was a young man who became totally blind after drinking 120 c. c. of wood alcohol. The ophthalmoscope at that time showed optic neuritis, which passed into marked atrophy. In this case there was the same delusive improvement in vision as in my case and Viger's. The man became able at times to recognize people at some distance, but the sight at last accounts was reduced to light perception in one eye and fingers at six inches in the other.

Moulton's was very similar to the preceding one—total blindness twenty-four hours after drinking wood alcohol, with subsequent improvement to light perception in one eye and fingers at one foot in the other.

He was not seen by Moulton for some months after the poisoning, the ophthalmoscope at that time showing apparently simple nerve atrophy. Holden (9) mentions McCoy's and Michael's case and one other reported by Callan at the *New York Academy of Medicine*, and in describing the result of an experimental poisoning of a dog by himself says: "There were post-mortem changes in the rods and cones; the bipolar cells of the inner nuclear layer appeared normal. The nerve fiber and ganglion cell layers were slightly œdematous, but no hemorrhages were found. Many of the ganglion cells were in a state of degeneration. In the optic nerves, stained by Marchis' method, the medullary sheaths of some of the fibers were broken down." From this, Holden concludes that it is evident that the amblyopia (from methyl-alcohol) is the result of nutritive disturbances in the retinal ganglion cells, a conclusion which seems to me decidedly hasty. Aside from the fact that in the single experiment upon which it is based there certainly was a possibility of post-mortem changes in the ganglion cells, the clinical evidence is decidedly opposed to such a conclusion. The orbital pain noted in the case of my patient and that of Kuhnt, the positive neuritis observed by McCoy and Michael, and the complete blindness followed by marked but mostly temporary improvement, all indicate a primary affection of the optic nerve, though it may well be that the ganglion cells also suffer primarily.

1. Casey Wood, *The Toxic Amblyopias, Annals of Ophthal. and Otol.*, 1892-94.
2. De Schweinitz, *The Toxic Amblyopias*, Philadelphia, 1896.
3. Mengin, *Rec d'Ophtal*, 1879, p. 663.
4. This bibliography is defective; see appendix.
5. Kuhnt, *Zeitschrift f. Augenheilkunde*, 1899, 1.
6. Viger, *L'Annee Medicale*, June, 1877, p. 100.
7. McCoy and Michael, *Medical Record*, May 28, 1898.
8. Moulton, *Ophthalmic Record*, July, 1899.
9. Holden, *Archives of Ophthalmology*, March, 1899.

A CONVENIENT APPARATUS FOR TESTING THE COLOR SENSE.

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Illustrated.

For some time I have been desirous of procuring some practical appliance for office use in testing the color sense, other than the Holmgren test. I have made use of a light and colored glasses for some time, but could not find in the market any apparatus whereby colored glasses could be conveniently used for this purpose.

For the one that is here described I claim nothing original, as I am wholly indebted to Dr. C. H. Williams, of Boston, for the ideas used in the construction of the essential parts.

The lantern which he exhibited before the section on ophthalmology at the last meeting of the *American Medical Association*, after reading his excellent paper on "The Examination of the Visual and Color Sense of Railway Employees," has been taken as a model.

As I journeyed homeward from Columbus I busied myself with making a sketch of a lantern, in which I did not strive to improve on the doctor's lantern, but only sought to simplify and bring into a more compact form the essential parts of his lantern.

Having decided to employ a 10-candle power incandescent lamp with a frosted globe for the illuminant, and to make the lantern a permanent fixture in my office, it was comparatively an easy matter to secure both simplicity and compactness in its construction.

The photograph presented herewith, shows the lantern *in situ* in my refraction room. The box for the lamp is made of ⅜-inch maple wood and is 3 inches square by 4 inches high, and painted a dead black inside and out. It was left open at the back, as the wall to which it is secured is also painted a dead black to form a suitable background for test cards. The top is movable and has an aperture in the center, through which the small end of the lamp globe is thrust and then screwed into its socket. Hence when the lamp is dropped into position, the box is tightly closed and light is emitted only from an aperture ¾ of an inch in diameter, made in the front and near the top of the box.

There are two brass disks, one 5 inches in diameter, and pierced with 9 apertures ¾ of an inch in diameter, each filled with a colored glass. There being three shades of green, three of red, and one each of rose, yellow and blue. To facilitate the turning of it, this disk has a milled edge.

The other disk is smaller by ¼-inch than the one just described, and is turned by means of a small knob in the center. This disk has 6 apertures, ranging in size from ¼ to ¾ of an inch in diameter. It is placed over the larger disk when they are both in position on the box, and both turn on the same pivot. This pivot is so placed on the front of the box that by turning either disk, the center of any aperture may be made to correspond to the center of the aperture in the box, where light is emitted.

By means of a catch attached to the box, and a shallow notch, opposite each aperture in the disks, the disks may be revolved separately and made to stop at any desired point.

Aside from the utility of this appliance as an auxiliary in testing the

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color sense, which is not the purpose of this paper to discuss at all, I have found it very convenient to use the luminous spot where the colors are displayed, when using the phorometer or the Maddox rod. So the time-honored candle in my office has been relegated to the dark room, where it still performs faithful service in determining light perception and light projection of cataractous eyes.

The work of constructing this apparatus was all done from my sketch, by a mechanic in this city, with the exception of blackening the brass disks and fitting and setting the colored glasses, which work was done by E. B. Meyrowitz, the well-known instrument maker of New York City.

CAPSULAR CATARACTS.

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Illustrated.

During the past year the operation for secondary or capsular cataract has been more or less discussed; this discussion has revealed the fact that while some feel that the operation is followed by no ill results, others abstain from operating unless absolutely necessary.

I cannot find, from a casual perusal of the modern text-book of ophthalmology, or of the discussions, any definite statement of its technique; I think this is most important, there is no difficulty in punching a hole through the capsule, but how to do it with the least possible injury is the question, and my design in writing this article is, by defining the technique and stating the results that follow my operations, and by arousing criticism or discussion, to derive benefit from the experience of others in the minor details of their operations and their results.

Some years ago it was my habit to use two hooks and tear the capsule, or a single hook with a stop-needle (Agnew's); these operations were often followed by severe reaction, iritis, a mild form of cyclitis or hyalitis; when we consider that the vitreous is an organized body we realize that this tearing, by a hook, produces a laceration instead of an incision, and, not only is the aqueous lost in every case, but the vitreous enters the anterior chamber and we are fortunate if, on withdrawing the hook, a thread of vitreous does not adhere to it. Feeling that this was an injury to the eye, I abandoned this practice, resorted to the use of a narrow Graefe knife, and, although excellent as a cutting instrument, the corneal

wound was dependent on the thickness of the capsule and amount of manipulation required, and the aqueous was also lost in every instance.

The knife-needle, with the excellence of modern manufacture, leaves little to be desired except in tough capsules, where, I believe in some cases no knife will either cut or even enter the capsule, and, for these, Wecker's scissors are preferable, although a clumsy instrument, requiring a large corneal incision; the more delicate scissors that have been devised I have found inclined to spring without cutting; the punching instruments that I have seen and tried need no comment, as I have found nothing of sufficient delicacy to warrant advocating its use.

During the past ten or twelve years I have operated on a great number of capsules, performing the secondary operation, where the patient lived at a distance, eight or ten days after the primary, when the eye warrants the operation; in no instance have I met with any reaction of sufficient severity to cause me any anxiety, in fact, in a large percentage, there is absolutely no injection eight hours after the incision.

In my opinion the most important points in the operation are perfect illumination, position of corneal puncture, and knowledge of the condition of the capsule and a sharp knife.

It is impossible to use diffused light with any satisfaction, except in cases of a densely opaque capsule; the focalizing of light, by an assistant, is annoying, the trembling of the hand holding the lens disturbs the clearness of vision.

I have therefore devised an electric light whose focal distance can be regulated; attached to my light I can use either a pair of fixation forceps or a knife-needle; I have then perfect illumination controlled by myself, and it makes very little difference whether the eye is moved or not, as my knife is always in the focus of the rays of light.

This instrument I have found invaluable and of the greatest assistance in all cases, more especially the wrinkled transparent capsules.

The knife should always be entered at the sclero-corneal junction and farthest away from the intended puncture through the capsule.

By puncturing the cornea at the junction we obtain the greatest sweep possible for the knife, and there is less likelihood that a vitreous bead will follow the removal of the blade.

If there is any synechia present and the appearance of the capsule warrants a puncture at that point, I prefer to make it there, as I get the additional support of the dilating iris.

A straight incision of sufficient length in an elastic capsule I have always found sufficient.

Knapp's axiom "Cut but do not tear" is sound in cases where it can be followed; in a case where a knife refuses to cut, the capsule may tear, at some weak point, in spite of our utmost care.

No one can state definitely the best time to operate; the appearance of the eye, the reaction which has followed our primary operation will, to a certain extent, govern our decision, but the sooner the operation is performed, the more elastic will be the capsule and the less the difficulty in cutting.

In regard to the selection of a knife, I personally have preferred a sickle-shaped blade of a medium size, and always remove the temper from the shank of my knife so that I can bend it in any position I wish; this is particularly advantageous in cases where we desire to puncture the cornea from the nasal side, as any desired angle can be given the blade.

I have never succeeded in obtaining a knife-needle whose edge is perfectly satisfactory; the points are usually excellent; one has to search diligently through a number to find one that is sufficiently sharp; the steel, however, is soft and can be easily stropped and the edge made equal to a sharp Graefe knife.

STRABISMUS, OR SQUINT. A THEORY AND TREATMENT.*

BY FRANCIS VALK, M.D.

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The extremely interesting paper on "The Etiology and Educative Treatment of Convergent Strabismus," by Priestly Smith, M.R., C.S., reviewed in the OPHTHALMIC RECORD from the *British Medical Journal*, July 2, 1898, points to the innervation theory of squint for its etiology, as he states that "convergent strabismus is a disorder of innervation in which the visual centers fail to control the act of convergence," and also dwells on the old theory of relative hypermetropia with its influence on accommodation and convergence, thus placing all cases in the same category.

Donder's antithesis, on page 415, is as follows: "Hypermetropia causes accommodative asthenopia, to be actively overcome by strabismus convergens. Myopia, to muscular asthenopia, passively yielding to strabismus divergens." A very beautiful theory, which has found so many admirers and diciples, but how many cases do we meet that completely refute and demolish his propositions?

*Read before the *Ophthalmic Section of the New York Academy of Medicine*, May 15, 1899.

Hansen Grut advances the innervation theory for his cases of convergent squint, the position of rest for his divergent cases, and suggests that after death, or in ether narcosis, the eyes diverge; but in reference to this Schweigger says that he knows that neither "death nor narcosis is the natural condition of man."

Walfors states: "In my opinion squint depends upon an antecedent anomaly of the muscles, in which, under the influence of several accompanying factors, among which innervation plays an important part, carries the eye into a squinting position." I regret that I am not fully acquainted with Walfors' theory in full, but it seems to me that the first part of his proposition may lead us to the true theory.

Schweigger's articles do not seem to advance any particular theory, unless it is that of Donders, but refers to all in a general way, while Landolt also seems to hold to the antithesis of Donders.

All these writers have advanced their ideas on the subject of the causes of squint, in which one writer will directly oppose the theory of the other, so that when one reads the diverse opinions of such eminent men in the profession of ophthalmology he feels somewhat at a loss to understand what are the causes of squint.

Every physician must form his own opinion of the existing condition of the human body, either pathological or functional from his individual experience in the results of his cases, and to formulate a theory must take many years of constant observation, with a large number of illustrative cases. Hence any theory must be so advanced that it may meet the indications of all cases, even though we may grant the proposition that the "exception proves the rule."

For several years I have watched and studied in all their varying conditions my cases of strabismus, and I have felt that in all I could see and note a cause and effect based on the proposition which I have stated in a previous paper and further improved from subsequent observations, as follows: That the eyes move under the innervation derived from two centers of the brain: first, in the field of fixation, in which all the straight muscles of the eye are capable of receiving nearly the same amount of innervation, and consequently, under the stimulation of the will power, turns the eye equally, or nearly so, in all parts of the field of fixation; second, that the eyes move in the field of fusion, in which they do not move under the direct control of the will power, but about a common point, in certain directions, under the stimulation of a center that is not influenced by the action of the will, called "unconscious innervation," and this center receives its stimulation from the desire for fusion of the images on the retina. These movements seem to be controlled by the

relative power of the straight muscles, as shown by their size and points of insertion into the sclera.

Granting the above conditions as existing and controlling the movements of the eyes and the direction of the visual lines, we may construct a theory that will elucidate and explain the causes of all conditions of strabismus.

Hansell, of Philadelphia, says: "It is unscientific to attempt to separate the muscular from the innervational apparatus, the more so as the latter comprises both the fusion force and the impulse conveyed by the nerve trunks; and equally futile is it to speak of one muscle as having more power, as measured by prisms, than its corresponding muscle in the other eye." Having read this I turn to Stevens and find: "All these determinations having been made with sufficient care (that is, the equilibrium test, etc.), the examiner proceeds to ascertain the relative power of the different pairs of muscles by finding the strongest prism with which images can be united in different directions." If, then, the prism test is unscientific and useless why use it at all? In my opinion I consider it the only reliable test for the relative power and the indications of a muscular anomaly.

The conditions for this theory depend upon the muscular conditions of the eyes, as shown by prisms, when associated with certain other conditions in the eyes themselves; in other words, the position of the visual lines depend upon the fusion power, or guiding sensation of the eyes and the relative power of the straight muscles.

If we study the theories and the propositions as advanced for the causation of squint, then all the cases must be placed under one head or class, dividing them simply according to degree, as latent, periodic and fixed; and though the majority of writers apply the same theories to all alike, yet to my mind, and because of my experience, there seems to be two distinct classes, with their respective conditions, that cause the squint. Into these two classes we may divide all our cases of squint and then proceed to develop a theory that will cover both classes, in which the relative power of the straight muscles of the eye must and do play the most important part.

Then, as I have always claimed (and I am glad to see that other writers are now alluding to it), we must take into consideration the guiding sensation of the eyes, this essential fusion power, if we would find a reasonable cause for squint and its dependence on the relative power of the muscles.

Before proceeding further with the argument let me, in a few words,

give you the conditions of two cases of squint found in two girls of the same family.

Rebecca L., age 14, convergent concomitant squint, fixed in the left eye, onset, when one year old. R.E.V.=$\frac{20}{20}$, L.E.V.=$\frac{20}{200}$, Ah.=1. D. ax. 90° in each eye. Ophthalmoscope and retinoscope show the same refractive condition. Operation, tenotomy on the left internus, when 7 years old, or 7 years ago. To-day there is no evidence of the squint, the cosmetic effect is very good, the visual axes seem parallel and she seems to fix with both eyes at the near point and yet the visual power is the same as at first.

Edith L., age 11, convergent concomitant squint, nearly always fixed in the right eye, onset, when 6 years old, V.=$\frac{20}{20}$, in each eye, Hm. 1.50 D in each eye. No astigmatism, ophthalmoscope and retinoscope show about 5 D. of hyperopia. Has homonymous diplopia of 30°. Glasses were ordered for this case, with complete disappearance of the squint.

In passing I would also call your attention to a case of divergent squint that I operated on a very short time ago, when on the exposure of the tendon of the internus it was found to be very small, not more than ⅛ of an inch broad; while the externus of the same eye was found to be more than ¼ of an inch broad. This, you will admit, is pretty strong evidence of the muscular action on the cause of squint.

Now it seems to me very strange, when we compare the clinical history and the results of treatment of these two cases, how any one can consider them both under one class and hold that any one theory will cover both cases. There must be some different cause acting in each case to produce the squint. Will the innervation theory or the antithesis of Donders' include both of these cases?

Therefore, I believe that in the proper study of the causes of squint, we must first divide them into two great classes, as illustrated in the two cases given above. Perhaps we may not be able to "draw the line" very perfectly between these two classes in all the cases of strabismus, but at all events near enough for all practical purposes, and as I have watched and studied my own cases I feel almost positive that we can do so, while I have verified my conclusions over and over again in my clinical work.

In May, 1894, I read a paper on Strabismus before the *Medical Society of the County of New York*, in which I made the proposition to separate the cases into these two classes, and since then I have convinced myself of the correctness of my proposition, but, at the same time, to-day I would still further advance my ideas on the muscular theory, and in the second class of cases I would also place the balance of power in the ocular muscles as the true and primal cause of all these cases of strabismus.

After a careful study of all my cases and trying to ascertain the true cause of squint, I would state that it depends almost entirely on the balance of power of the straight muscles of the eye; not as Walfors would have us believe partly on an antecedent anomaly of the muscles, but simply on their balance of power and that innervation, or the position of rest, has nothing to do with it. If I am not mistaken this can be proved in all cases.

Now this balance of power in the action of the straight muscles of the eye, or as Duane has so well classed it, the power of *duction* as shown by the prism test, has been proved long ago by many observers and their tests. I would particularly refer to the tests made by my friend, Dr. J. M. Banister, Surgeon U. S. A., in his very careful examination of 100 soldiers, who never had any asthenopic symptoms whatever and with vision $\frac{20}{20}$, or better.

This balance of power of these muscles in their relation to each other, as shown by the fusion power or guiding sensation, will even during sleep determine the position of the visual axes.

Placing then the muscular balance as the chief cause of squint, we also find other minor causes that will influence the position of the visual axes. First, congenital amblyopia in one eye, and secondly, an antecedent anomaly of the muscles associated with relative hyperopia, as suggested by the first part of Donders' antithesis, or any refractive condition from that of emmetropia to the most complicated astigmatism.

I have now the notes of 130 cases of squint, collected from my private and clinical practice, of which I note three cases of partial paralysis of the muscles that may be excluded from this theory, leaving 127 cases to be divided as follows: Divergent, 14; convergent, 113. These again I would divide, and I think the difference is clearly shown: Divergent, first class, 7; second class, 7; and convergent, first class, 44, and second class, 66, with three cases unclassified, as they were too young to test the visual acuity.

I will now call your attention to what I consider determines these two classes, why they should be thus separated and the causes therein acting to produce the squint. In these two classes I feel positive we may place all our cases of squint, either divergent, convergent or those of the vertical deviation, and I hope to show you some material advantage in so separating the cases into two classes.

In those of the first class we find this condition: Amblyopia, always congenital, the primal and sole cause, vision less than $\frac{20}{100}$, associated with a normal balance of power in the lateral moving muscles. Hence, with the loss of the fusion power or the guiding sensation, the eye quickly turns in the direction of the most powerful acting muscle, namely, the

internus, in convergent squint; and the externus; in divergent squint, etc. This is well illustrated by the early onset of the squint, in cases of this class, and it is very beautifully proved by the cases of amblyopia of the same kind, that do not squint and will always show the same power in abduction as in adduction.

In the second class of cases we find this condition: Some refractive error, either hyperopia or myopia, with or without an astigmatism and with this an "antecedent anomaly of the muscles" or, in other words, a weakness of some one of the straight muscles of the eyes acting either laterally or vertically. In convergent squint there is a deficiency in the power of the externi, and in divergent squint there is a deficiency in the power of the interni, while the same rule will apply to all squints in the vertical direction. (Are not these cases very difficult to prove by any other theory?) In this class of cases, if the squint has existed for any length of time, we may have what is called "amblyopia ex anopsia," arising simply from non-use and the suppression of the image in the squinting eye. I think that it is in these latter cases that we have the reports of the restoration of the vision after an operation or the sudden loss of the fixing eye. The theory as applied to this class is beautifully illustrated in those rare cases of convergent squint, with myopia; a condition that I do not think can be explained in any other way.

The fact that all these refractive conditions may exist without squint has been the hard question to answer, or rather I have not been satisfied with the explanations that have been offered so far as I have been able to consult the writers on this subject. Yet it is from this fact, associated with an imbalance of the ocular muscles, that I have come to all my conclusions and I have yet to see and study the cases that cannot be clearly placed in one of the two aforesaid classes.

Fuchs, in the last edition of his text-book, gives the etiology of strabismus as follows: "Strabismus is, therefore, the result of the combined action of two factors, diminution in the visual power of one of the eyes and a pre-existing disturbance of the muscular equilibrium, according as the latter factor consists in a preponderance of the external or internal ocular muscles, a convergent or divergent squint is produced," and considers all cases of divergent squint as being myopic.

The same ideas have been advanced by Stilling and also by Swan Burnett, but I do not think that they cover all cases, as so many have no diminution of the visual power, while others have no disturbance of the muscular equilibrium according to Nature's standard. It is utterly impossible to place them all under one general head, therefore, we must

separate them into two classes and then our theory will cover them all; for in the first class we have no muscular anomaly, but a normal balance; and in the second class, a muscular anomaly with or without a refractive error.

Let me now take up the argument in reference to the first class, which I will illustrate with a typical case: A child, born of perfectly healthy parents, is normal in all respects, the visual axes perfectly parallel, and the power of the external muscles of the eyes properly balanced. Now, one eye is amblyopic, in which there is no fusion power, complete absence of the guiding sensation in that eye, hence there is no tendency to fix the visual line (and I believe this power comes very early in life), then with these conditions, it therefore seems very reasonable to me, that the eye would turn in the direction of the most powerful muscles. In convergent squint the eye turns inward and remains so, as there is no stimulation to make it resume its normal position. The same argument may apply to divergent squint under the same conditions.

Before proceeding further we must understand what this condition of amblyopia is; objectively we can find no evidence of a want of vision, for the examination with the ophthalmoscope gives us the same picture as is shown in the other eye, and as Maddox says the macula appears "tantalisingly perfect," but subjectively there is all the evidence of the want of vision. These amblyopic eyes will not have a restoration of the vision under other conditions, no matter what may be the testimony to that effect by other writers. I make this statement because I have failed to ever meet a case, because a careful study of the various reports show some flaws in the estimation of the visual power and because other observers, just as careful and experienced, have made the same statement. Hence does not our clinical experience teach us that we do have a congenital amblyopia, not a suppression of the retinal images? For just as soon as we can possibly test the vision of a child who squints, say at 5 years of age, we find it less than $\frac{20}{100}$, and waiting five years longer it is still the same. Can any one claim that there has been a loss of the physiological sensibility of the retina to reduce the vision from normal to less than $\frac{20}{100}$, in the first five years of life, and yet after that, or in the next five years, with the squint remaining, there has been no further loss of retinal sensibility, and the vision remains the same. I would also refer you to those cases where we have an amblyopia of the same kind, in which there never has been any tendency to squint, and yet the vision remains the same through life, while they seem to have binocular fixation. I therefore cannot understand the claim that this condition is amblyopia ex anopsia.

Furthermore, in the same cases the squint is never corrected; it may remain until they are about 30 years of age, and then the convergence disappears, the visual axes are parallel and remain so, and yet we find the vision about the same as stated above.

May we not forcibly ask: "Does all the loss of vision take place in the first five years of life and then remain so?" To me an answer is hardly required to such a self-evident fact.

Moreover, examine those cases of monocular amblyopia who never had any deviation of the visual lines and invariably you will find that the normal balance of power does not exist—that adduction is the same as abduction, that version of the eyes is normal; there is no preponderance of power in either of the lateral muscles, and that the amblyopic eye simply follows its fellow in the associated movements.

To repeat, what, then, are the conditions of our first class of cases? First, congenital amblyopia, associated with a normal balance in adduction and abduction, then, taking from the eye its power of fusion or the guiding sensation, the eye must turn in the direction of the most powerful muscles—namely, inward or outward, up or down, as the case may be —the same conditions acting on the other eye under the screen test, for the visual lines maintain their respective distances, showing that the squint is concomitant.

This is not a preëxisting disturbance of the muscular equilibrium (Fuchs), nor is it due to the eye assuming a position of rest, but simply to the normal power of adduction over that of abduction, when the retina is deprived of its guiding sensation by the amblyopia. The above argument will also apply to divergent squint, or the vertical variety, but in these cases we have a muscular anomaly acting in the same way.

I now pass to the argument for the second class of cases, but in this I wish to change, or rather to extend, my views as published in my last paper on squint, mentioned before in this paper.

In this class a child is born with perfectly normal vision in each eye; there is generally an error of refraction, either with or without astigmatism, and there is always an imbalance of the ocular muscles.

Now, we notice as the child begins to play with small toys or to use the eyes at the near point it begins to turn one eye inward at times, called periodic squint. This condition may continue until the child is 5 years old, when one eye constantly turns inward, called fixed squint. Does hyperopia cause this, when we see so many hyperopes that have no tendency to squint? May we not reasonably attribute it to an insufficiency of the externi? I think that this imbalance of the ocular muscles will

also explain the reasons for squint in the cases of emmetropia, myopia or astigmatism without hyperopia.

Now, strabismus is generally convergent, and why? We know that the centers for convergence and accommodation are very closely associated in the oculo-motor tract beneath the aqueduct of Sylvius and the floor of the fourth ventricle, and as the child begins to use the eyes, if it is hyperopic, it requires a greater power of accommodation. The stimulation for this condition is conveyed to the cerebral centers and so stimulating the power of convergence; then with the existing want of power in the externi we have the convergence of the visual lines.

Assuming this to be the condition, what becomes of the image formed on the retina of the squinting eye? First, the image of the object falls upon the least sensitive parts of the retina—namely, the inner peripheral part—there forming an indistinct image; secondly, the image, whatever it may be, that is formed at the macula, or most sensitive part of the retina, is not in focus, the rays coming from a far different plane than the object, and again we have an indistinct image. Consequently the visual centers will readily suppress these indistinct images formed on the retina, and only single vision results. We can now say there is a loss of vision from "physiological sensibility through psychical exclusion in the squinting eye, but we must remember that the sensitive retinal elements are still the same and may be developed to their former power when the eye is used under proper conditions. The vision is naturally reduced in one eye from disuse, the so-called amblyopia ex anopsia, and may be improved by an operation, by glasses, or the exclusion of the other eye.

Strabismus has been divided into latent, alternating, and fixed, each and severally, one of degree, and if so do they not all depend upon the relative power of the straight muscles of the eyes? It has been stated that I "fall into error when I speak of the strength of the straight muscles estimated in this manner," referring to the test with prisms, and that "his argument seems illogical," but if I am in "error" or "illogical" I shall be glad to be convinced of my fault, for I have studied the cases of squint coming under my observation time and time again, both in my private and hospital practice, and have read all the literature that I can find on this subject, yet I have only been more and more convinced that this theory of the action and the relative power of the ocular muscles is the chief and determining cause of all cases of strabismus. I have yet to meet with a case that cannot be explained in one of these classes, and in which I can readily demonstrate the influence of the ocular muscles in the production of the squint.

Moreover, on the other hand, we meet so many cases with all the other essential conditions that we find in squint, and yet there is no deviation of the visual lines. Take, for instance, those cases of amblyopia congenitalis in one eye, perhaps hyperopic or astigmatic; no asthenopia; intelligent, bright people, between 15 and 30 years of age; they have perfect binocular fixation, but no binocular vision or sense of the "third dimension," but they have never had the slightest tendency to squint; yet the amblyopic eye follows the other in all parts of the field of fixation. I have tested these cases over and over again, and have invariably found exophoria, or in other words, by the test in which I am said to be in error, the relative power of the externi was the same, if not slightly greater, than that of the interni. Abduction was the same as adduction, and with the absence of the fusion power there was no tendency to turn the amblyopic eye inward.

Furthermore, I have never seen an explanation of the cause of squint in myopia when it is convergent. Surely the "position of rest" cannot cause it, nor the last clause of Donder's antithesis, but, on the other hand, a decided weakness of the externi may readily cause the eye to turn in under the stimulation for fixation at the near point.

Again, if the innervation, the position of rest, the hyperopia or any other of the advanced theories is the cause of the strabismus, then why do we operate on the muscles by tenotomy or advancements that simply and solely alter the relative power of the straight muscles of the eyes? And does not this muscular theory apply to the action of the muscles in the verticle meridian, in which we have an upward or downward strabismus?

Maddox says "non-paralytic squint, therefore concomitant, is purely due to excessive activity of the converging innervation," but I do not think his arguments prove it, as squint does not always disappear under the influence of an anæsthetic and "innervational habit" has nothing to do with physiological conditions.

I would also refer to the "natural cure of squint," in which you will have the history of convergence of one of the eyes for several years, until they have become about 30 years old, when the squint disappears and they have perfect binocular fixation. This, as far as my observation goes, always occurs in the squint of the first class, or those with congenital amblyopia. Now examine these cases and you will find the amblyopia the same in reference to the vision, but if you carefully test the relative power of the lateral moving muscles by the prism test you will have abduction the same as adduction. Now what has become of the "innervation" or the "habit"? Has not the contracted internus lost its power

after all these years and the eye finds its natural position and follows the other?

I do not wish to take up your time with illustrative cases nor with any further arguments in favor of this muscular theory, but I shall be pleased to see the case of squint of any kind that cannot be explained under the head of one of the two classes, always excepting any case of paretic squint.

Finally, with these conclusions in reference to the theory of strabismus and granting that they are correct, then the management of all our cases is clearly indicated, having determined the class to which the case may belong. It only requires the intelligent application of the treatment to finally end in success.

Now what are the indications of the first class, or strabismus with congenital amblyopia? I do not believe that in any case we can restore in any way binocular vision, but our aim must simply be to equalize the muscular balance and so attain a perfect cosmetic effect in order that the eye may keep its natural position with reference to the fixing eye; that after an operation glasses may be ordered and used, if there are any indications for them, but that all attempts to restore the vision will be useless.

Our treatment then becomes simply one of an operation to improve the cosmetic appearance, and that by one operation only, as, *shortening of the weak muscle* and a complete tenotomy of the powerful one. If you will put a "tuck" in the weak muscle, externus or internus, as the case may be, with the catgut suture, as I have suggested in an earlier paper, then do a complete tenotomy on the opposing muscle and tie your suture so as to bring the eye into the primary position, you will have corrected an ocular defect with a single operation that will not tend to return. I have followed this procedure in my office and clinic for several years and have yet to record the first failure.

In this class and by this method we will not have to operate on the fixing eye—a great comfort to our patients—while the suture will be absorbed, so that we do not require a second operation for its removal.

These cases cannot be cured by the use of atropine and glasses, but must have an operation just as soon as the visual power can be tested, so that we may decide if one eye is amblyopic, and after that glasses if needed. Amblyopia is usually associated with hyperopia, but I do not think the refractive condition is a factor in the causation of this class of strabismus.

In the treatment and the technique of our second class of cases—and these are in the majority—we are now confronted with a far different

problem, in which we must seek to restore binocular vision, perfect fixation and the ultimate restoration of the vision in an eye that has lost its power to see from disuse.

Now we have two conditions to consider—primarily, an imbalance of the ocular muscles, and secondarily, a refractive error. These two conditions must be worked out with all the objective and subjective tests at our command before we take into consideration any operative interference. Here we may have all kinds of refractive conditions and all the different degrees of squint not latent, but apparent, alternate, periodic or fixed, from that of the slightest diplopia to a fixed squint, in which there is monocular vision of the fixing eye and reduced vision, with perhaps an eccentric fixation area, in the other eye.

Hence the exact and correct estimation of the refraction, even under the full effects of a mydriatic, is the first essential, as, while I believe all these cases are associated with an imbalance of the ocular muscles, either those acting laterally or those acting vertically, yet the correction of the refractive error will in many cases so relieve the strain on the fixation power and restore the guiding sensation that the use of proper glasses will correct the tendency to a mal-position of the visual lines, and the squint disappears. But this procedure will not succeed in all the cases of the second class, and after the glasses have been adjusted the squint remains. We must then decide on an operation and look for our indications in the power of the opposing muscles.

An upward or downward squint will, as a rule, only require a complete tenotomy on the most powerful muscle, while in the lateral squints, particularly those of slight degree, we may advance or shorten the weaker muscle, if indicated, or, finding that of normal power in the field of fixation, we may safely do a complete tenotomy.

In all the cases of this second class they must be carefully studied according to their degree and indications, but in *all* the correction of the refraction must follow the operation.

In the first class I do not think the educational treatment will be of any service, but in the second class the education of the squinting eye to fix and to appreciate the images will be of great service, and in closing I might say that this is the object of this paper, namely, to prove that in certain cases it is useless to resort to any measures except an operation and inothers to do all we can, both before and after the operation. I have tried to show the indications for each procedure.

CORRECTION OF DIVERGENT STRABISMUS BY A NEW METHOD AND NEW INSTRUMENT.*

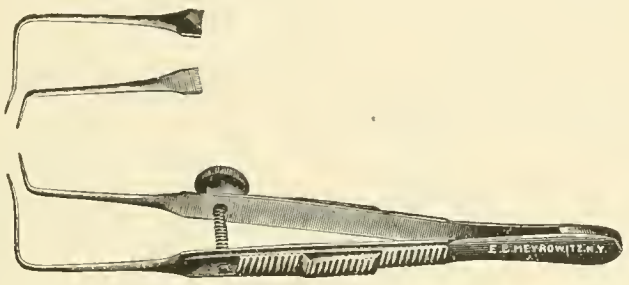
BY D. MILTON GREENE, M.D.,

Eye, Ear, Nose and Throat Surgeon to U. B. A. Hospital and Holland Home for the Aged: Lecturer to U. B. A. Training School for Nurses, Grand Rapids, Mich.

Illustrated.

It is not the desire of the writer to enter into a detailed discussion of the ætiology and diagnosis of the various kinds of squint, or to review the different operations for their correction. I shall not thresh over old straw by reiterating what can be found in every text-book of ophthalmology further than is necessary to bring this subject before you.

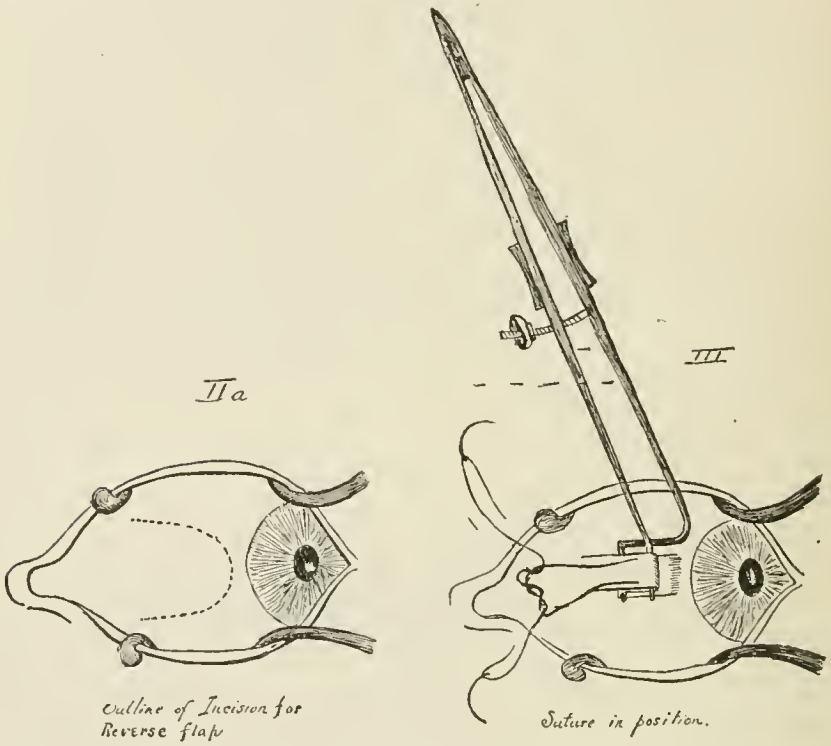
The various operations which have been proposed and practiced for the correction of divergent squint, as is well known by those experienced



in operating, have not been universally satisfactory to the surgeon or to the patient. In fact few oculists of wide experience with whom I have discussed the operation of advancement of the rectus internus for divergent squint have hesitated to acknowledge their failures, and that the operation is one unsatisfactory in many instances. There is no operation which I have undertaken with greater circumspection and fear. Whether the operation be that of George Critchetts, or the hitching thread of Agnew, the anchoring thread of Prince, or the clamp forceps of Wecker, while each has its advantage, they have also elements of weakness. One common source of failure, however, is cutting the tendon from its ocular, or bulbar, attachment.

*Read before the *Mich. State Med. Soc.*, May 6, 1899.

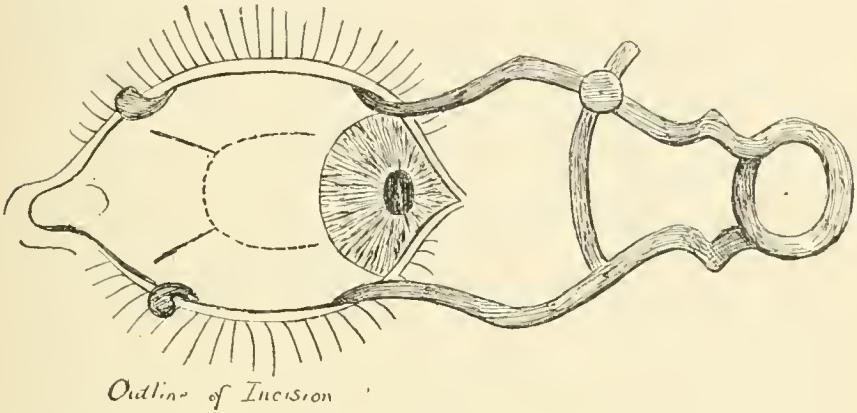
When the tendon is once severed, or cut loose, and fastened by sutures, should the sutures fail to hold it, either because of slipping or cutting through the tissues, which they so frequently do, the muscle is liable to recede and the deviation of the eye outward to become greater than before the operation. When this accident has happened, a second operation is hard to execute, and is undertaken with dread by the surgeon as



well as by the patient. If the sutures which are passed through the conjunctiva and emerge near the vertical diameter of the cornea (as in the Critchett operation), cut or slough, very little effect of advancement will be secured. If the sutures are carried into the scleral or epi-scleral tissue deep enough to prevent their cutting their way out, there is danger of wounding the intercommunicating lymph spaces and filaments of the ciliary nerves. Again all operations in vogue necessitate leaving in the sensitive conjunctiva several sutures and knots which excite, in many instances, a high degree of inflammatory action and swelling, which

tends to cause divergence of the eye we have tried to converge by the operation.

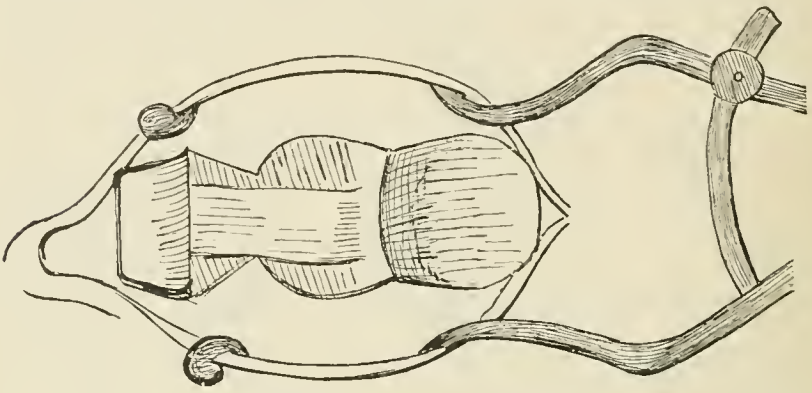
I had tried several expedients to get rid of the objectionable features of the operation which I have already mentioned, when several years ago I conceived the idea of taking a tuck in the tendon, which I did several times by the use of the sutures. I thought it a new idea, but upon searching the literature on the subject I found it had been done before by J. F. Noyes, of Detroit, in 1874, and by Lagleize in 1892. The methods proposed by them, while doing away with the dangers of detaching the tendon, still necessitate the objectionable conjunctival sutures. To avoid these and the bad results of the muscles slipping back and the consequent



divergence of the eye, I have invented an instrument called a Tendon Tucker.

The instrument is made with two spring blades like those of Knapps' roller forceps. On blade 1 there is a tine about 10 mm. in length and 1 mm. in diameter, tapering slightly toward the point and turned at right angle to the edge of the blade. On blade 2 there is an angular arm 15 mm. in length turned at right angle to the flat of the blade and toward blade 1. On this arm is a tine turned at right angle to the edge of blade 2 and parallel to the tine of blade 1, and of the same size. It is so constructed that the tine of blade 2 passes beneath blade 1. A set screw with a milled nut passes from blade 2 through blade 1. With this the blades can be fixed at any point desired. It is better to have two instruments, one for the right and one for the left eye, so that the tines can be inserted from above downward, which gives free access for the introduction of the suture in the tendon, the blades being above and

out of the way. With this instrument the operation is much easier executed, and is done with less risk and in much less time than by the old methods. Those who have tried the muscle-folding operation of Noyes and Lagleize by the use of sutures, have, I believe, found it a difficult task to perform. My operation is quite different from any other and is done and is as follows: The patient is told to look to the side in the direction of the divergence, thereby turning the eye as far outward as possible. The conjunctiva is raised with a pair of fine forceps (iris forceps are good) and with a pair of fine curved scissors, with the hollow side toward the



Tendon Exposed.

cornea, commencing near the corneal margin (2 or 3 mm.) and 6 mm. below the horizontal axis, a curved incision is made ending at the horizontal axis, about 12 mm. from the sclero-corneal margin. Then turning the scissors and commencing above the horizontal axis about 6 mm. a second curved incision is made to intersect the first, thus forming a flap 12 mm. in length. Two incisions are now made in the conjunctiva, one obliquely upward and inward, and one obliquely downward and inward. These latter incisions include tenons capsule.

When these flaps are turned back the tendon of the internus will be fully exposed. The muscle and tendon are then separated completely from all surrounding tissue, except its attachment to the globe. When free the tine of the straight blade of the instrument is passed beneath the tendon from above downward, while the tine on the angular blade rests upon the tendon near its insertion. Now by pressing the blades

together the tine resting upon the tendon passes under the other tine, and makes a tuck in the tendon which it pushes beneath the muscle. Now the milled nut is screwed down and when the eye is perfectly straight, or has been carried inward a little past a correction, the instrument is held by an assistant, and a stitch is taken in the fold of the tendon as follows: A No. 1 steralized catgut suture is armed with a curved needle at each end. One needle is passed through the fold between the tines from within outward about 1 mm. from its upper edge; then the other needle is passed through in like manner 1 mm. from the lower edge. The needles are now removed and the two ends of the suture tied by a surgeon's knot, which securely holds the fold. The conjunctiva is now replaced and a stitch or two taken in the flaps, which brings them over the catgut suture and the folded tendon, and causes the conjunctiva to unite in 36 or 48 hours. The eye is bandaged for a day, or cold compresses may be applied for a few hours and then bandaged. There is a slight lump left at the point were the tendon is folded, but it soon disappears. The tendon in cases of divergent squint is usually elongated and thin, reaching 13 to 15 mm. or more, while the tendon normally is but 9 or 10 mm. in length. This thinning of the tendon makes the old operation harder and the one with my instrument easier to perform than if it were in the normal condition. Should the suture fail to hold the tendon until union takes place in the fold, a second operation is easy to perform because the tendon is in its normal position and attached to the globe and will not recede, as sometimes happens where it has been detached. This accident has never happened to me after an operation of tendon folding such as I have described. The cause of failures in other tendon-folding operations which have been done by stitches, is that the surfaces of the folded tendon are not brought into perfect coaptation.

With the instrument which I have devised the tendon is perfectly folded and held while the suture is inserted and securely tied across the fibers of the tendon, instead of lengthwise, as is the case in some operations.

It gives me pleasure to acknowledge the valuable services of my friend, Dr. John R. Rogers, in producing the drawings illustrative of the operation described in my paper, which are presented herewith.

THE

OPHTHALMIC RECORD.

A MONTHLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY.

VOLUME VIII. CHICAGO, SEPTEMBER, 1899. No. 9. NEW SERIES.

EDITORIALS.

ANTIPATHY TO BINOCULAR SINGLE VISION.

Such cases, fortunately, are not very common; yet, unfortunately for the sufferers, they are not always recognized. Such a case came under the observation of the writer to-day, a correct diagnosis having previously been made by Dr. Manning Brown, his former pupil. The case has always been one of alternating squint and early in life was operated on with the view of straightening her eyes. The operation failed, and later another was done. Still later a third, and then a fourth operation was done, each one resulting in increased annoyance to the patient. At first the squint was internal and the false image was too far away from the true to be very troublesome. After each operation the diplopia became more annoying. Dr. Brown was led to his conclusion of the hopelessness of effecting binocular single vision by the fact that he could not fuse the images by means of prisms. He could make them approach, sometimes closely, but they persistently declined to fuse. The refraction was 2.50 D. hypermetropia, each eye. The correcting lenses gave no aid, although vision was practically perfect in each eye.

Can these cases be diagnosed? If diagnosed, what should be done? In answer to the first question it may be said that, with proper care, a reasonable conclusion can be arrived at. Such cases are nearly always alternating internal squint in the beginning, that is, before any operation has been done. Vision in the two eyes is about perfect after correction of errors of refraction. Now, double vision is not a prominent symptom, though occasionally it is present (after operations diplopia is nearly always complained of). The red glass before one eye will always bring out the diplopia, but every attempt to fuse, by means of prisms, the red

and the white lights, results in failure. A prism of one strength bringing the two lights close together, the prism next in strength will throw the false on the other side of the true, or it will rise above or pass below it.

What should be done in such a case? When images cannot be fused by means of prisms, operations cannot effect a fusion, and therefore should not be attempted. The only satisfactory explanation for this condition lies in the possible fact that the "yellow spot" in one eye is connected with the right side of the brain and, in the other eye, with the left side of the brain. It would appear reasonable that the mind cannot interpret as one, similar impressions made on brain cells in the opposite halves of the brain.

Any attempt at relieving disfigurement will create an annoying diplopia which can be relieved in only one of the following ways: Cover the eye that is least frequently used; render the one eye highly myopic by a strong convex lens so as to favor mind suppression; or blind one eye by optic neurotomy. Any operator would be slow to resort to the latter procedure, for obvious reasons, but in some of these cases, and because of improper muscle operations, it might be justifiable.

Every case of alternating squint with fairly good vision in each eye should be looked on with suspicion, and should be dealt with carefully.

G. C. S.

MICROSCOPES FOR THE EXAMINATION OF THE ANTERIOR SEGMENT OF THE EYE.

Besides the many modifications of the simple microscope, or strong convex lens (loupes), proposed for use in examining the eye by oblique illumination; there have been a number of attempts to utilize the compound microscope for the same purpose. The first was probably that made by Liebreich (1855), who substituted a microscope body for the mirror of his large demonstrating ophthalmoscope. Among the latest attempts in this direction have been those of Aubert (1891), who by a double inversion secured an erect image; and Barkan and Schanz (1893), who illuminated the cornea by an electric lamp, the rays from which were concentrated by a convex lens upon the point for which the microscope was focused.

A new form of compound microscope for viewing the eye has been worked out by Mr. H. L. De Zeng, Jr., and described (*New York Med. Jour.*, June 17, 1899), by Dr. Lucien Howe, who suggests it might be

called a Kerato-iridiscope. It is especially notable for the size of its objective, and the ease and convenience of its adjustments. The objective has a clear aperture 32 mm. in diameter. It admits so much light that a well illuminated image is obtained with ordinary daylight, although strong lateral illumination does somewhat improve it. The size and flatness of its field are very satisfactory; and it is of value for photographing the anterior portion of the eye.

In addition to vertical and horizontal adjustments, the tube is so swung upon the column which supports it, as to give a universal motion that greatly aids in keeping the desired part of the eye steadily in view within the field of the instrument. This largely overcomes one of the chief difficulties heretofore encountered in using instruments of its class.

The chief advantage of the compound over the simple microscope, for the examination of the eye, is that with the former higher magnification can be obtained, without bringing the instrument so close to the eye as to interfere with the illumination. With the simple microscope, the lens must be brought within one inch of the eye to get an enlargement of ten diameters. But the instrument in question with a free space of two inches between it and the eye, magnifies from 20 to 125 diameters. With the lower powers it can be very well used without any special rest for the patient's head; but with the higher powers something of the kind would be desirable.

Perhaps the most serious defect about the instrument described by Howe is that it is monocular. This defect is shared by most of the various forms of "loupe" used by Ophthalmologists. Still it is a serious matter to be deprived of the advantages of binocular vision, in making a clinical examination of the cornea and iris. Aubert's instrument is binocular; and Westien applied Bruecke's loupe (made on the plan of the Galilean telescope or opera-glass), to the binocular examination of the eye by oblique illumination.

Under the name of binocular corneal microscope, S. Czapski, of Jena, describes (*Graefe's Archiv. für Ophthalmol.*, Band xlviii. Abt. I, 1899), an instrument for which he employs illumination by an incandescent lamp attached to the instrument; and in which an erect image is secured by the prism systems of Porro. The axes of the objectives are set at an angle of 16°; and one of the eye-pieces is made adjustable, so that by it the observer may correct any anisometropia he may have. The magnifying power of the instrument ranges from 9 to 63 diameters; and with the highest power the distance between the observed eye and the objective is 28 mm. The diameter of the objectives is not stated; but from the illus-

trations accompanying the description, and the necessities of the case, it seems that the illumination of the magnified image must be quite inferior to that obtained with the instrument described by Howe.

With regard to the usefulness of these instruments, it is probable that Laqueur is too pessimistic when he says (System of Diseases of the Eye, Edited by Norris and Oliver): "The use of the corneal microscope is illusory. There is no new fact that owes its discovery to the microscope in its application to the living eye. Whatever can be seen by its means can be seen more easily and surely with the binocular corneal loupe. For this reason it is rarely used, and it is doubtful whether it will ever be useful in examining the living eye."

While admitting that it is yet of but little clinical value, I believe it has a real value for the prosecution of original investigations, particularly of diseases of the iris. The turbidity of the cornea that commonly attends corneal disease, very generally prevents any gain by high magnification. But slight changes in the iris are often strikingly demonstrated in this way. When the application of the binocular lens has made Ophthalmologists more generally familiar with the appearances of the eye in various diseases under an amplification of from 5 to 10 diameters; and when original investigators have accumulated a certain amount of data with the compound microscope, it is but reasonable to anticipate for the latter instrument an important field of clinical usefulness.

Edward Jackson.

CORRESPONDENCE.

THE REFRACTING OPTICIAN.

To the Editor of the Ophthalmic Record:

In the writer's opinion, the optician question will cease to be an abuse when ophthalmic surgeons adopt the method that has been used by himself for some time with satisfaction to his patients, and to himself.

It is understood that the average optician is in active competition with us, doing all the *fitting* that he can, sending us only the cases that he finds he cannot help; also in many of the cases which we send to him with prescriptions, taking the liberty of changing these without orders from us, and often making slighting remarks regarding us in particular and oculists in general. This being the case, the spirit of protection compels us to take means to combat this condition, and this can be done without much compunction, as the average optician is so only in name, not making his glasses, but sending his orders to some larger house. It was the writer's custom before removing to this city to furnish his patients their glasses, and this custom has been reëstablished for his protection, *with the important addition of furnishing prescriptions at almost cost.* This enables patients to see that they have been paying from one to ten hundred per cent profit, and they will probably realize that they are, perhaps, not gaining as much as they thought by patronizing opticians. In my own case the satisfaction of patients in obtaining their glasses, *plus* the fee for an examination at about the cost of glasses from an optician, is at least noticeable, and will in time, if adopted, bring the price of glasses down to a reasonable figure, which fact in itself will correct the abuse, as the great profits in prescription work is what calls so many to this work. A large wholesale drug house states that hardly a day passes without several inquiries being made as to where *fitting glasses* can be learned. This method can be made practical, as with some care and practice frames can be obtained that will, at least fit better than most of those noticed on the street, and such work can be given to one's clerk after instruction. Steel frames and spherical lenses can be furnished at a profit at fifty or

seventy-five cents, and compound lenses in the same frames at from seventy-five cents to one dollar, and at such prices will drive the *refracting optician* out of the field and leave work enough for honest prescription opticians, with whom the ophthalmic surgeon should be on the most cordial terms.

Wm. E. Baxter,
553 Boylston St., Boston.

CATAPHORESIS OF THE LACHRYMAL DUCT.

To the Editor of the Ophthalmic Record:

In your May number I see an article by Dr. Geo. F. Keiper of Lafayette, Ind., on "Cataphoresis of the Lachrymal Duct." This is an abstract of a paper in which he claims originality for these cupped sounds. I have before called his attention to the fact that he is not the author of the instruments nor the method. He has in his possession Wm. H. Armstrong & Co.'s Catalogue, edition 1894, in which are described and illustrated Brewster's Cupped Lachrymal Sounds, which are practically identical with those shown in his illustrations. His conclusions so dogmatically stated are absurd. Purulent inflammations of the sac and duct do not "yield better to this form of treatment than any of the older methods." The method is itself an old one and practically abandoned. As Dr. Keiper buys his instruments from Armstrong & Co., of course he is familiar with the catalogue named.

Your readers will of course remember his "Original Method of Treating Trachoma" published in the Record. The method there described was simply the use of copper electrodes or the oxychloride of copper treatment, which had been known for years and published in McIntosh's Electrical Catalogue and everywhere else. I mention this old article published by the doctor merely because the article in regard to cupped sounds for the lachrymal duct and the one in regard to trachoma were united into one paper when read before the County Medical Society here. At that time in the open meeting I called attention to the doctor's lack of sincerity.

W. H. Peters, B.S., M.D.

REVIEWS.

Orbital Complications of Empyema of the Ethmoidal Cells. By Dr. Vieusse (of Toulouse), *Recueil d'Ophtalmologie*, March, April, May, 1899.—We all know the close relationship which exists between diseases of the eyes and disturbances in the neighboring sinuses, and yet, strange to say, the subject has not been ventilated as it should have been. Panas, in his book, has devoted one chapter to this question, but it cannot be said that he has brought forward any points which would be especially valuable to the surgeon in making the diagnosis nor has he given us any valuable therapeutic suggestions. It is true that here and there in literature one will find references to the subject, but as a rule the author has not recognized the connection between the point of departure of the trouble and the complication to which it gives rise in the orbit, and as a consequence we have uncertainty in diagnosis and in treatment. Vieusse, of Toulouse, has recently analyzed many of the cases reported, and has presented some valuable conclusions. In order to appreciate the subject in its entirety Vieusse has touched upon all its aspects, not only upon the orbital complication, but he has also gone thoroughly into the history at a period before the disease manifested itself in the orbit. He gives an elaborate description of the normal anatomy of the ethmoidal region which need not be discussed here. More pertinent, however, is the description of the changes produced in this locality by disease.

The first thing that strikes us are the changes in the mucus membrane. We find congestion and even hemorrhages which may be attributable to the loose structure of the mucus membrane. This congestion extends to the deeper layers. Purulent secretion is only seen after hyperæmia has existed for a long time, in which case we find the membrane much softened and frequently infiltrated with a yellowish liquid. When the catarrh has become chronic the exudate is seen chiefly in the internal lining of the mucus membrane. We have here great relaxation and swelling of the membrane, which is now several times its original thickness and somewhat resembles jelly. The glandular apparatus undergoes cystic degeneration. Ordinarily the cavity of the ethmoidal cells is simply narrowed

in proportion to the swelling in the mucus membrane. Purulent inflammation of the mucus membrane of the cells is less frequent than catarrhal inflammation. In the purulent variety the cells enclose a more or less large quantity of purulent mucus, and sometimes their cavities may be filled with either a purulent or a bloody exudate. The result of all these changes is that we have either a narrowing or a complete closure of the avenues of communication between the ethmoidal cells and other pneumatic cells in the vicinity. In chronic catarrh, where the inflammation has been present in the deeper layers of the membrane, we get periostitis with the development of exostoses, which later on may be seen loose in the cavities of the cells. We have sometimes destruction of the osseous surroundings of the labyrinth. When this condition of the mucus membrane has disappeared it can regain its normal appearance.

These, then, are the chief anatomical changes, and the author goes on to report a case which he had seen in the Hôtel-Dieu.

The patient was a man who had been for three months a sufferer with epistaxis from the left nostril. Violent pains were felt on this side of the head, and a small tumor appeared at the inner angle of the eye on the same side. The tumor jutted out slightly and forced the eyeball outward and downward. The movements of the eyeball were intact, but the patient complained of diplopia. There was a nasal twang to the voice which was easily explained by the discovery of an obstruction in the left nostril. The tumor was soft and fluctuating. The ophthalmoscope showed dilated and tortuous veins and narrowed arteries, V. about 1/5.

An incision 6 cm. long was made, starting from the inner canthus and parallel to the lower border of the orbit. After getting through the skin and subcutaneous tissues, a cheesy yellowish-looking substance resembling tuberculous matter was pressed out. After removing this debris it was demonstrated that the inner wall of the orbit was almost entirely destroyed. The index finger was passed through the opening and it was found that the nasal fossæ was also filled with this tuberculous material, which was removed with curette. Drainage was accomplished through the corresponding nostril. Eight days later the wound had cicatrized and the diplopia had disappeared. The difficulty, however, of respiration persisted, and a careful examination by a laryngologist revealed ethmoidal disease. The diseased area was cocainized and afterward curetted. In twelve days the tissues looked normal except that two little granulations were to be seen jutting out from the ethmoidal cells. These were gotten rid of with galvano-cautery. This last measure resulted in permanent disappearance of the symptoms.

Case II. When seen the patient (man) had slight exophthalmos and outward displacement of the eyeball. His left eye began to protrude four years previously, but no other local symptoms had ever been present. He was subject to frequent attacks of coryza, and usually the lachrymation on this side was very abundant. A few days after his entrance into the hospital there was to be seen decided enlargement at the inner canthus of this eye, and there was a muco-purulent secretion from the conjunctiva. No pain. In a few days, however, a dull and constant ache was felt over the eyebrow and from this point down over the malar bone, and this was accompanied with redness of the eyeball, swelling of the face on that side and loss of vision. There was also slight œdema of the lower lid, which involved the upper part of the cheek and extended toward the temple. The exophthalmos was quite pronounced and the eyeball was pushed outward and downward. The muscular movements were intact, there was no diplopia, and the vision was hardly 1/5. The upper part of the eyeball was very red, and this injection extended toward the sclera and was more pronounced at the inner angle of the eye. There was a slight muco-purulent secretion. Palpation of the eyeball caused pain, and on pushing the finger into the orbit upward and inward a growth was felt which did not extend quite to the orbital rim. It appeared to be about the size of a hazelnut. The tear channels seemed all right, and there was no excrescence in the fronto-orbital region. For a long time there had been a coryza, and when the patient blew his nose violently he felt pain at the inner side of the orbit. From the rapidity with which these symptoms had manifested themselves acute tenonitis was at first diagnosed. The presence of the swelling at the inner angle of the orbit and the deviation of the eyeball soon dissipated this theory. Examination of the antrum of Highmore and of the nasal fossæ showed these parts to be sound. There was then no implication on the part of the frontal sinus. In the course of a few days the œdema of the lid and of the jaw disappeared, but the deviation of the eyeball persisted. The patient was chloroformed and an incision was made commencing at the inner angle of the orbit about a centimeter from the palpebral fissure, then on upward and outward under the eyebrow, following the ridge of the orbit for about five centimeters further. When the bone was reached the periosteum was detached and the tumor exposed, and no sooner was the latter touched than the characteristic crepitation was noticed. On penetrating the tumor the instrument passed into a cavity and at the same time a mucoid fluid escaped through the wound. The orifice was enlarged and the finger introduced, and it could be easily seen that the cavity

extended toward the base of the skull. The diagnosis was made of dilatation of the ethmoidal cells. The cavity was irrigated with boric acid solution and a large mass of mucus was brought away, but no purulent material. A drainage tube was introduced and iodoform dressing applied. In two days all the symptoms had ameliorated and the vision had mounted up to ½. The irrigations were continued and always a large mass of muco-purulent matter was washed out. Two months later vision was practically normal. This was the only case which was observed by Vieusse himself, all the remaining cases which he describes having been recorded by others.

In case IV. the frontal sinus was opened four times and cleaned out; and while there was improvement after each operation, it was evident the disease had not been properly located, as was ultimately shown by the speedy and permanent disappearance of the symptoms following the discovery and removal of diseased areas in the ethmoid cells. The objective symptoms in this case were the same as in cases I. and II.

Case VI. was rather interesting. The patient was a child and had a fistula at the inner angle of the left eye, and had been under treatment for a long time for dacryocystitis. Exploration showed that the fistula extended far back and suggested that the origin of the trouble might be either in the ethmoidal cells or in the sphenoidal sinus. Two operations were performed and at the second operation an opening was made clear up to the nasal fossæ and the seat of the trouble was found to be in the ethmoidal cells. Case VII. resembled in many features the foregoing one. Case X. (reported by Dr. J. H. Bryan of Washington, D. C.). The patient was a man sixty-eight years old. For ten years he had been a sufferer with intense neuralgia, located at the inner angle of the left eye, extending over the face and head on that side and always aggravated by an acute coryza. For several years there had been a discharge of a yellowish pus from the left nares. No orbital tumefaction and no visual disturbance. Investigation with a sound showed caries of the anterior ethmoidal cells, which region being well opened recovery soon followed.

Case XIV. (reported by Raoult of Nancy). A child of eight years, who had a fistulous opening at the inner angle of the left eye. Pus was constantly escaping from the opening. The child had had scarletina and on recovery an abscess showed itself just where there was now a fistulous opening. The trouble was treated for some time as an affection of the lachrymal sac, inasmuch as there was profuse lachrymation. There was difficulty experienced in breathing through the left nostril. The inferior

turbinate bone was hypertrophied. After the usual incision the fistula was curetted and a large quantity of osseous material was removed, though no sequestrum was found. Twenty days later the wound appeared cicatrized. Three weeks later another abscess formed at the edge of the old fistula. The external opening was enlarged and an opening made into the nares, removing at the same time some of the middle turbinate bone. The ethmoidal cells were then curetted. The trouble disappeared within a few weeks.

Symptomatology.—The conspicuous symptoms are tumefaction of the lid, exophthalmus and a tumor at the inner angle of the orbit. The tumor may either be diffused or it may be sharply defined, round or irregular in shape. The tumor usually ranges in size from a pea to a hazelnut, though it may run the whole length of the internal wall of the orbit and may even extend far back into the orbital cavity. The tumor is as a rule insensitive to the touch, though it may be the reverse, and it is soft and fluctuating and when strong pressure is made upon it one will often notice a discharge from the nose. At other times it may be soft anteriorly and behind it may be hard and elastic and give out the sensation of crepitation. The movements of the eyeball are only curtailed in a slight degree. The œdema of the lids is most marked at the inner third of the lid and may be confined either to the upper lid, or it may be present in both lids. Binocular vision is sometimes abolished and diplopia is not infrequently seen. Neuralgia is often present and is confined to either the inner angle of the orbit or it may be present all around the eyeball. Visual acuity may be affected in varying degrees. The ophthalmoscope frequently shows a hazy disc, arteries thin, veins dilated and tortuous, œdema of the retina and opacities in the vitreous body. Profuse lachrymation is often met with and may lead us to make a diagnosis of dacryocystitis. We may divide empyema of the ethmoidal cells into the acute and chronic form.

In the acute variety the disease manifests itself promptly by symptoms most marked in either the nasal fossæ or in the orbit, according to the starting point. If it involves the ethmoidal turbinate bones, one will notice difficulty of nasal respiration and the voice will have a nasal twang. Epistaxis and violent pains in the head are often present. The headache is most marked in the orbital region and is often worse at night. A very constant symptom is blenorrhea of the nose, which may be unilateral and is sometimes very abundant. Sulzer has noticed erysipelatous redness at the upper part of the nose. The discharge from the nose is usually odorless, except where all the ethmoidal cells are involved. Anterior

rhinoscopy shows the middle meatus filled up with a whitish mass and posterior rhinoscopy discloses the condition of the naso-pharynx and to a certain extent that of the sphenoidal sinus. Polypoid masses more or less numerous and voluminous are often seen. According to Ruault indistinctness of the nasal bone in a subject suffering with a discharge from the middle meatus of the nostril and presenting at the same time a translucency of the corresponding maxillary sinus, is strong evidence that the disease is located in the anterior ethmoidal cells. It sometimes happens that the orifice which connects the ethmoid cells with either the orbit or the nose is closed and pus then accumulates in the cavity which contains it (Forme fermée). In such cases the mucus glands secrete more abundantly and the cavity of the sinus is soon filled, giving rise to a mucocele which exercises a gradually increasing pressure upon the walls of the sinus. So long as the pus remains shut up in the labyrinth and there is no ectasia, the symptoms are more or less vague and it is by no means easy to diagnose the condition. When the distension has caused the jutting out of the orbital wall we at once have the same character of symptoms as were described in the preceding variety of the affection.

In the osseous form of the disease we have necrosis and usually the os planum is the bone which is destroyed. In this variety of the disease we have all the symptoms which have been just described. When the os planum has been involved the orbital symptoms will predominate, and if the process has extended toward the nasal fossæ the principal symptoms will be a purulent discharge from the middle meatus and sometimes there will be an ozena. Grunwald calls attention to the importance of passing a sound in order to make a diagnosis in a case of this kind. Before passing a catheter it would be well to evacuate the pus. Under the hypertrophied middle turbinate bone one will notice a cleft giving passage to fungus tissue, and a stylet, if passed through this cleft, will come in contact with a denuded surface. Sometimes when the catheter is inserted between the middle turbinate bone and the external wall of the nasal cavity there will be revealed lesions in the posterior ethmoidal cells.

In the chronic form of empyema the disease is very insidious and the symptoms very vague. When the disease, however, has lasted for a certain length of time, the usual symptoms of the acute form will show themselves. The rhinoscopic examination will show obstruction in the nasal fossæ and there may be pus in the middle meatus and the probe will frequently encounter eroded bone. To sum up the distinctive symptoms :

Acute empyema is characterized by pronounced symptoms from the very beginning.

Chronic empyema is characterized by vague symptoms at first, but later on the symptoms of the acute form appear.

Then we have a form of the disease where the subjective symptoms are very much accentuated and where there is a purulent discharge from the nasal fossæ empyème ouvert in contradistinction to that variety of the disease where there is no such discharge, empyème fermé.

We have, too, empyema of the anterior and posterior cells, with the localization of pus in both cases, and finally we have the osseous empyema where the probe gives the sensation of necrosed bone.

Etiology.—The close anatomical connection between the ethmoidal cells and the nose easily explains one frequent source of infection. The posterior cells are particularly exposed to infection, as they open right into the superior meatus. In fact, every inflammation of the nasal mucous membrane may find its way to the ethmoidal cells. Bresgen has reported eleven cases of atrophic rhinitis where he found involvement of the maxillary sinus and ethmoidal cells. Traumatisms of any kind may give rise to ethmoidal empyema, such, for instance, as blows from the outside, operations unskillfully performed, i. e., within the nasal cavity. Congenital and acquired malformations of the orifices of communication between the labyrinth and other pneumatic spaces, malformations which give rise to occlusions and so prevent a sufficient ventilation of the cellular cavities. Affections of the sphenoidal sinus can also lead to ethmoidal empyema and several such cases are recorded. Measles, scarletina and influenza can lead to empyema of the ethmoidal cells. Baumgarten has reported cases where the empyema could be traced to syphilis, tuberculosis and even to typhus. There are two ways by which the disease can reach the ethmoidal cells: by the bony way and by the veins. Where the inflammatory lesions of the periorbital cavities (such as those which arise in the maxillary, in either the frontal or in the sphenoidal sinus) spread in the orbit we know that it is by a bony path.

Diagnosis and Prognosis.—Sometimes disease of the frontal sinus may extend to the ethmoidal cells, then again suppuration in the latter point can invade either the maxillary or the sphenoidal sinus. In these cases the diagnosis is not easy to make. Whenever we have empyema of either the frontal or the sphenoidal, or of the maxillary sinus, we can look out for complication from the side of the ethmoid, if after vigorous treatment suppuration continues. As regards the frontal sinus, we will find localized frontal pains either at the border of the sinus or radiating

toward the temple and the nape of the neck, and aggravated by movements of the head and by pressure on the forehead. These pains are quite different from those one meets with in empyema of the labyrinth, where the pains are especially marked in the orbital region and are worse at night. We see more often in ethmoidal disease ectasia and perforation of the frontal walls. As a general thing, however, ectasia is a good deal less frequent in sinus disease and develops slowly. Whenever an ectasia is seen from the orbit we have an abscess varying in size from a hazelnut to a walnut and situated above the tendon of the orbicularis. The eye symptoms consist chiefly in œdema of the upper lid, especially at its inner angle, chemosis, some immobility of the eyeball, dilatation of the retinal veins and œdema of the papilla. Nasal symptoms are generally present, though Kühnt reports five cases in fifteen where nasal symptoms were absent. Usually we have at first an acute coryza, later on polyps are seen, the lower and middle turbinate bones swell, and most important is this symptom, namely, the flow of pus at the border of the middle turbinate. Catheterization and irrigation will confirm the diagnosis. When, after puncturing and irrigating the maxillary sinus, pus reappears some minutes after in the middle meatus, and when after catheterizing and irrigating the frontal sinus pus is not long in showing itself again, we may be almost sure that we are dealing with trouble in the anterior ethmoidal cells. Auscultation of the frontal sinus has been extolled by Czernicki as a means of denoting the presence of rales at the moment of forced expiration. It must be said, however, that the orbito-ocular complications of empyema of the ethmoidal cells can appear in disease of the frontal sinus, and in such cases the diagnosis is difficult, especially if it be a question of inflammation of the anterior cells. Illumination as practiced by Ruault is only valuable when taken in conjunction with other symptoms. The character of the pain is often so vague as to be valueless as a means of differentiating. We may have empyema of the sphenoidal cells confounded with inflammation of the ethmoidal cells, and when in doubt it would be better to do as Moure advises, employ the catheter. According to this author a sphenoidal affection is especially naso-pharyngeal, while an affection of the other cavities is oftenest nasal; one is posterior, the other anterior. The early appearance of optic nerve trouble would speak very positively in favor of sphenoidal disease. As regards differentiating from disease of the maxillary sinus, Panas has given us these points: A flow of pus from the corresponding nostril when the patient inclines the head forward, the pre-existence of ozoena, the presence of caries of the upper molars on the

same side, the presence of pus in the middle meatus. All these signs speak for disease of the maxillary sinus. When we meet with destructive processes in the ethmoidal cells with no accompanying pain we must think of syphilis as the cause and it may be said here that the objective lesions in cases of tuberculous origin present pretty much the same characteristics. The tumor may be confounded with a dacryocystitis. If it is reducible and empties itself on pressure into the nasal fossæ and the discharge is seen at the middle meatus we have ethmoiditis. The author then proceeds to speak of the various tumors, i. e., sarcomata, bony cysts, fibromata, which have been observed in the ethmoidal cells Fortunately, however, these are very rarely seen. As a rule the complications of ethmoidal empyema are not serious; still in the presence of such complications there are manifest reasons for giving a more or less reserved prognosis.

Treatment.—1. Evacuation of the pus. 2. Treatment applied to the mucous membrane. Gruening, Stewart and others are in favor of intervention through the orbit. Gruening thinks that thereby we can—first, make the most direct inspection and exploration of the ethmoidal cells; second, we can easily remove vegetations and carious bone; third, there is a better chance of assuring drainage by a counter opening.

Grünwald, Hicquet, Baumgarten and others prefer intervention through the nose. It is evident from the opinions advanced by these observers that one method is not the best for all cases of ethmoiditis. Vieusse then describes the operative methods practiced by Knapp, Gruening and Chipault. Randolph.

NEWS ITEMS.

Personals and items of interest should be sent to Dr. Frank Allport, 92 State St., Chicago.

Dr. Ulry, Chief of the Ophthalmic Clinic in the University of Bordeaux, is dead.

Busts of Wunderlich and Wagner were unveiled May 2d, at the University of Leipsic.

The monument in memory of Mauthner was unveiled at the University of Vienna, March 19th.

The late Mr. William Taylor, of Southport, has bequeathed £500 to the St. Paul's Eye and Ear Hospital, Liverpool.

International Congress on Behalf of Blind. — An international congress for the amelioration of the condition of the blind is to be held in Paris, August 1 to 5, 1900. For particulars address the Secretary-General, Maurice de Sizeranae, Avenue de Breteuil, 31, Paris.

The annual meeting of the American Ophthalmological Society was held at Pequot House, London, July 19th and 20th. A very interesting meeting was held; but we would like to see all of the members of this Society come and work in the Ophthalmological Section of the American Medical Association.

The Other Eye. — On one occasion, when seated in a club dining-room, W. S. Gilbert, the playwright, was approached by a person, who said:

"Have you seen here this morning a man with one eye called James?"

Gilbert answered, in his drawling way:

"What was the name of his other eye?" — *Tid-Bits.*

The Victoria Eye and Ear Hospital, Dublin.—At the second annual meeting of the above institution, held on February 14th, it was stated that a site for the new hospital had been approved. The estimate for the new building was £30,000, of which £19,000 had been received.

It was announced that Dr. C. E. Fitzgerald had resigned his position as surgeon, owing to other demands upon his time.

A practical subject well handled is that of Dr. Snell's address before the ophthalmologic section of the British Medical Association, on "The Prevention of Eye Accidents Occurring in Trades," which he concludes are largely preventable. He would make the use of eye protectors compulsory for workers in iron and steel, whose employment renders them liable to be injured by iron or steel splinters, or who are exposed to danger from molten metal.

A peculiar disease has been discovered in a herd of cattle near Clare, Iowa. Within a month, out of a herd of seventy-five, one-third have lost their sight. There is no known cause for the disease, as the pasture is one which has been used for several seasons. Stock-buyers and stock-growers are puzzled about the matter, and say they have never known anything like it. The blindness is peculiar in its character, and is caused by a film forming over the eye. State Veterinary Surgeon Gibson will examine the herd.

A writer for the *New York Medical Record*, writing from Penang, S. S., says:

"I think there would be a great field here for an eye and ear specialist, as there is a very great deal of eye and ear disease. Cataract is especially common. Tuberculosis prevails to a limited extent only. The influenza has prevailed to a large extent on at least three different occasions within the last few years, and appears to have left behind a legacy of weakened constitutions, which succumb more readily to the attacks of pulmonary tuberculosis."

Appointments. — Dr. Bass, of Freiberg, has been appointed Extraordinary Professor.

Dr. Snellen, Jr., has been appointed Professor of Ophthalmology in Utrecht.

Dr. Velez has been appointed Assistant Professor of Ophthalmology in the Faculty of Medicine of Mexico.

Dr. B. E. Fryer, of Kansas City, Mo., has resigned the Chair of Clinical Ophthalmology in the University Medical College of Kansas City; and has been elected Clinical Professor of Ophthalmology in the Medico-Chirurgical College, and also Professor of Ophthalmology in the Woman's Medical College of Kansas City. Dr. J. S. Lichtenberg, of Kansas City, has been appointed adjunct to these professorships.

The Cause of Blindness in Children. — Dr. Forster, director of the Ophthalmological Clinic at Breslau, has recently published some instructive statistics regarding the causes, other than ophthalmia neonatorum, of blindness in children. According to these, injury to the eyesight, with consequent blindness, is mostly occasioned by carelessness, more than twenty per cent of these cases being caused by playing with sharp instruments, and twelve per cent by malicious injury, such as blows, stone-throwing, whipping, and unsuitable means of correction. Similar results are shown by the statistics of most other ophthalmological clinics. Boissoneau, of Paris, reports that of nine hundred and thirty-nine children who were blind in one or both eyes, more than three hundred and fifty were injured by shooting and by the explosion of percussion caps. — *New York Medical Record, May 20, 1899.*

Moorfields is a name that at once calls up the thought of the great ophthalmic hospital of which the fame has gone forth into all countries. The old building became too straitened for its work, and removal was determined on. A site in the City Road was secured, and the Prince of Wales laid the foundation stone of the new hospital in 1897. On Tuesday last the Duke of York, accompanied by the Duchess, performed the ceremony of opening the new buildings. Moorfields has long been the resort of all ophthalmologists who visit London, and is likely to maintain its honorable position as a scene of important discovery and a school of ophthalmic medicine and surgery. As a hospital it is so famous that there is no doubt that at times it has been resorted to by many well able to pay. It is hoped that this abuse will in future be kept in check.

Woman's Quick Tact. — The following story illustrates a woman's quick tact in an emergency. It is about a college president who is a great gardener and wears a glass eye. One day this college president — it being summer and he on his vacation — rushed in from the garden all soiled and spattered, and without his glass eye. His wife was seated with a caller of importance. She perceived the special unfitness

of her husband's condition, and frigidly said to him: "John, go at once to the library and tell your master Mrs. ——— wishes to see him." He went, and soon reappeared, clothed, eyed, and in his right mind.

This college president, it is plain, is himself a man of presence of mind. There are plenty of men who, confronted by such a remark of genius as this, would have stared and faltered out: "But, my dear, ———" and spoiled it all.

It is gratifying to learn that the laity and the lay press are commencing to get the proper ideas of how, where and when to secure scientific refraction work, as is indicated by the following clipping from the New York *Post*:

"Looking back now to the time when the itinerant quack doctor and the wandering dentist spread misery and destruction over the land, we wonder at the tremendous ignorance or carelessness of our fathers in trusting their teeth, or even their lives, to hands so untrustworthy. A very similar thing is done to-day by people who buy spectacles or eye-glasses from men who sell them on the streets, or have their eyes fitted by opticians who have no qualifications for doing the work.

"A surprising number of people buy their glasses from venders on the streets. They get glasses for 50 cents which seem to them just as good as a pair they would pay $5 for having made on an oculist's prescription, and then they think they have saved money. Glasses acquired in all sorts of ways, by inheritance or exchange from a friend, or even glasses found on the street, are used to the detriment, even to the destruction of the wearer's sight. 'People seem to think glasses are like clothes,' said an oculist this morning, 'and if they are fairly comfortable, and look well, they ask ask no further questions.' Another way in which people damage their eyes is through carelessness in trying to remove dust and cinders from them. They themselves, a friend tries to rub, the nearest drug store, and the nearest optician is called on, all before an oculist is consulted. The result is that the eyeball is often badly rubbed and scraped, and in many instances permanent injury is done."

Dr. Moon's Quick Ear—How Blind Type was Invented for the Chinese.—The sensitiveness of the organs of touch and hearing possessed by the blind is illustrated in a remarkable manner by the following story of Dr. Moon, the inventor of the Moon type for the blind, says the *Youth's Companion*:

Soon after the introduction of the type an opportunity occurred to test its adaptability to foreign languages. The experiment was first made in Irish, and proved entirely successful. Strangely enough, the next was the Chinese. Knowing something of the great prevalence of blindness in China, he longed to provide embossed reading in that tongue. One day an old friend, a captain in the navy, greeted him with the words: "So, Dr. Moon, I hear you can't leave the Chinese alone now?"

"Not while they have any blind among them," was the reply.

"Well, would you like to see a real Chinaman? If so, I will with pleasure introduce you to a Chinese gentleman, a friend of mine." And Dr. Moon met the foreigner the following evening.

The Chinese gentleman, Mr. Ho Chee, gratified his visitor by repeating the Lord's prayer several times in the Ningpo dialect. The ear of the listener had long been trained in the accurate distinguishing of sounds, and he dictated to his secretary the Chinese syllables as his ear had caught them. When he parted from his oriental friend he gave himself up to the task of adapting his alphabet to the Chinese language.

On the evening of the following day he was ready to pay a second visit to his new acquaintance. After unrolling his embossed page he read aloud the words "Woo Ting Foo," but he was allowed to go no farther, for the Chinaman sprang from his seat, and, putting one hand on Dr. Moon's chest, and the other on his back, patted him before and behind, exclaiming, "Oh, you got 'Our Father!' You shall have some tea." And it was not until he was refreshed with a cup of the fragrant bohea that he was allowed to proceed with the prayer, which proved to be substantially correct. Thus began embossed reading for the Chinese blind, which has since been greatly developed, and adapted to several others of the dialects beside that of Ningpo.

In view of the increasing prevalence of vertical handwriting, and its bearing upon vision, the following clipping from one of the daily papers may be interesting:

VERTICAL HANDWRITING.

EDGAR ALLAN POE EVOLVED IT FROM HIS INNER CONSCIOUSNESS.

"The vertical penmanship that is now employed in the New Orleans school is a great improvement on the old style," said an experienced educator, chatting with a New Orleans *Times-Democrat* writer about mod-

ern innovations. "It is not as decorative as the familiar 'Spencerian'; but it can always be read, which one must admit is certainly an advantage in the matter of writing. The vertical system is supposed to be comparatively new; but it is a curious fact that I have never seen adverted to in print that it was employed in nearly all its present details by Edgar Allan Poe during the early days of his authorship. I examined several pages of Poe's manuscript not long ago in a fine collection of autographs, and I was impressed at once by the similarity of his handwriting to that now taught in the schools. It was remarkable. In fact, the only difference I could find was in the formation of his capital T's, which were made in the French style. The vertical scheme is said to be the result of a great deal of scientific experimenting along the lines of legibility and speed. Poe evolved the same thing out of his inner consciousness. His writing was beautifully clear; and he said, you know, that he cultivated it to attract the attention of people who read manuscript for the magazines. Thomas A. Edison, by the way, writes a hand that resembles it to a really startling degree."

Trachoma.—Alkire considers trachoma as an infectious disease, favored by lower vitality, and he sums up the indications for treatment as follows: 1. Absolute cleanliness and good hygienic surroundings. 2. Improvement, if possible, of the nutrition of the body by correcting the existing abnormal conditions. 3. Removal of the trachoma bodies and the use of antiseptic solutions in the eye. 4. Correction of the refractive errors. 5. Treatment of sequelæ according to the nature and indications.—*Medical Monograph, abstracted from Journ. Amer. Med. Asso.*

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Argentamine is non-caustic in medicinal solutions. Instilled into the conjunctival sac, it causes neither burning nor pain; nor does it ever occasion the intensely irritant effects, epiphora, blepharospasm, and chemosis so often seen with the nitrate. Argentamine has a far stronger antiparasitic action. It is not precipitated by the normal saline and albuminous fluids of the urethra and conjunctiva; the ethylenediamine in it readily dissolving both albumen and silver chloride. Hence it penetrates into the deeper epithelial layers and destroys the micro-organisms present there, whilst silver nitrate is precipitated in an insoluble and inefficacious form Argentamine can be used in all cases suited to the exhibition of silver nitrate.

Argentamine has been employed for several years in **Prof. Hoor's Eye Clinic** in Klausenburg in a large number of affections of the conjunctiva with highly gratifying results. The conjunctiva treated with Argentamine becomes paler, the swelling diminishes, and secretion decreases. Burning and pain are absent, and the patient can open his eyes without trouble.

Dr. Josef Imre, of Budapest, has used Argentamine extensively in conjunctivitis, catarrhal and gonorrheal ophthalmia, purulent keratitis, trachoma, etc., and recommends it strongly to ophthalmologists.

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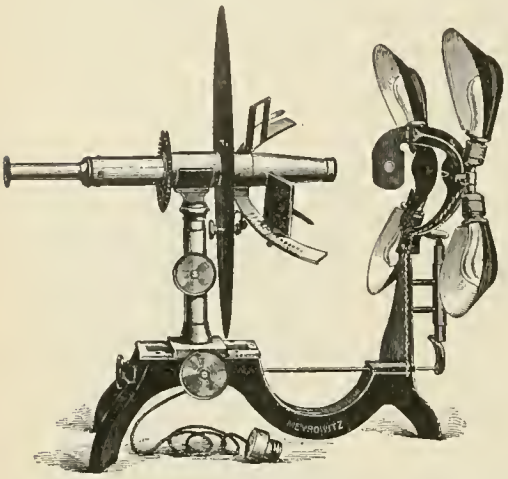

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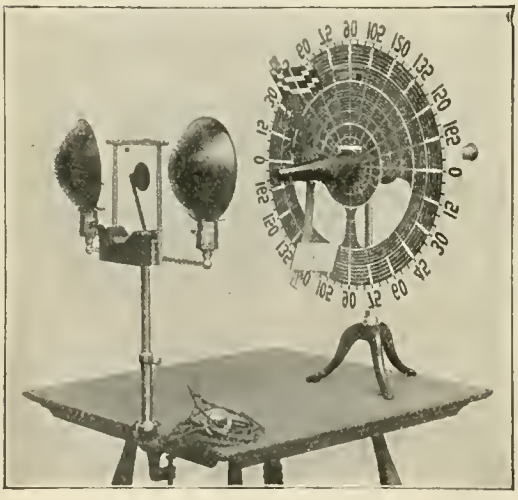

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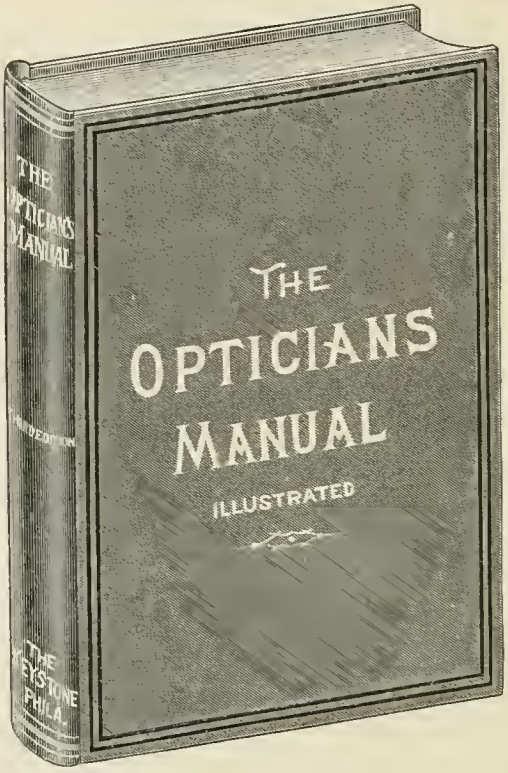

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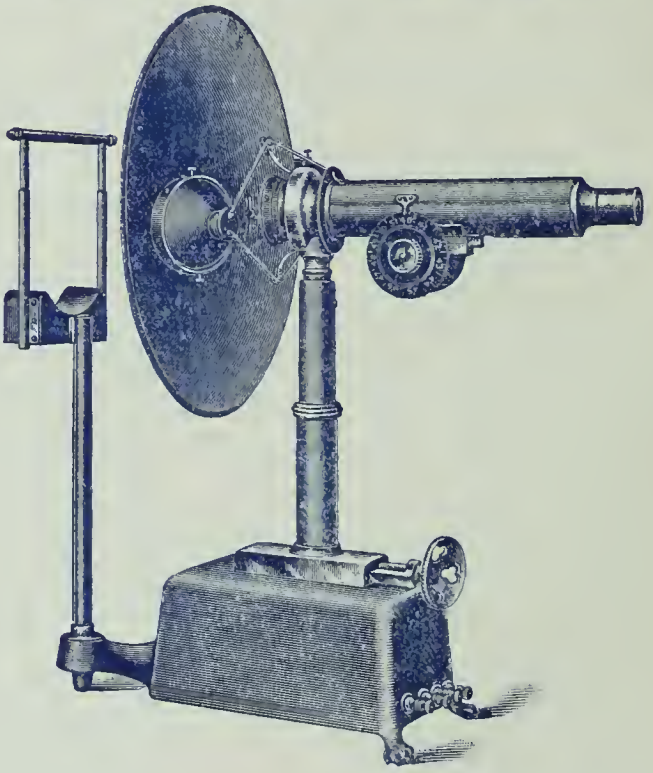

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